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ABSTRACT

Intended to assist school districts in designing high school credit courses, preparing staff development activities related to computer utilization, and selecting and evaluating instructional software, this document offers outlines for the following student courses: (1) Introduction to Computers, a computer literacy course covering computer components and terminology, computer capabilities and limitations, computer uses and careers, and introductory BASIC; (2) Computer Mathematics, which teaches the logic of computer programming, flow charting, BASIC language programming, and the application of programming to problem solving using algebraic and geometric concepts; and (3) Advanced Placement Computer Science, which addresses programming methodology, features of programming languages, data types and structures, algorithms, applications of computers, computer systems, and social implications. A computer literacy and computer assisted instruction course for instructional staff is also outlined. Resources for teaching about computers are listed, including general resources, filmstrips and magazines, and instructional television and radio programs. A list of favorably reviewed microcomputer software and a software evaluation checklist are reprinted from the "1983 Educational Software Preview Guide" (Educational Software Evaluation Consortium). A supplementary annotation describes each software title listed. (LMM)

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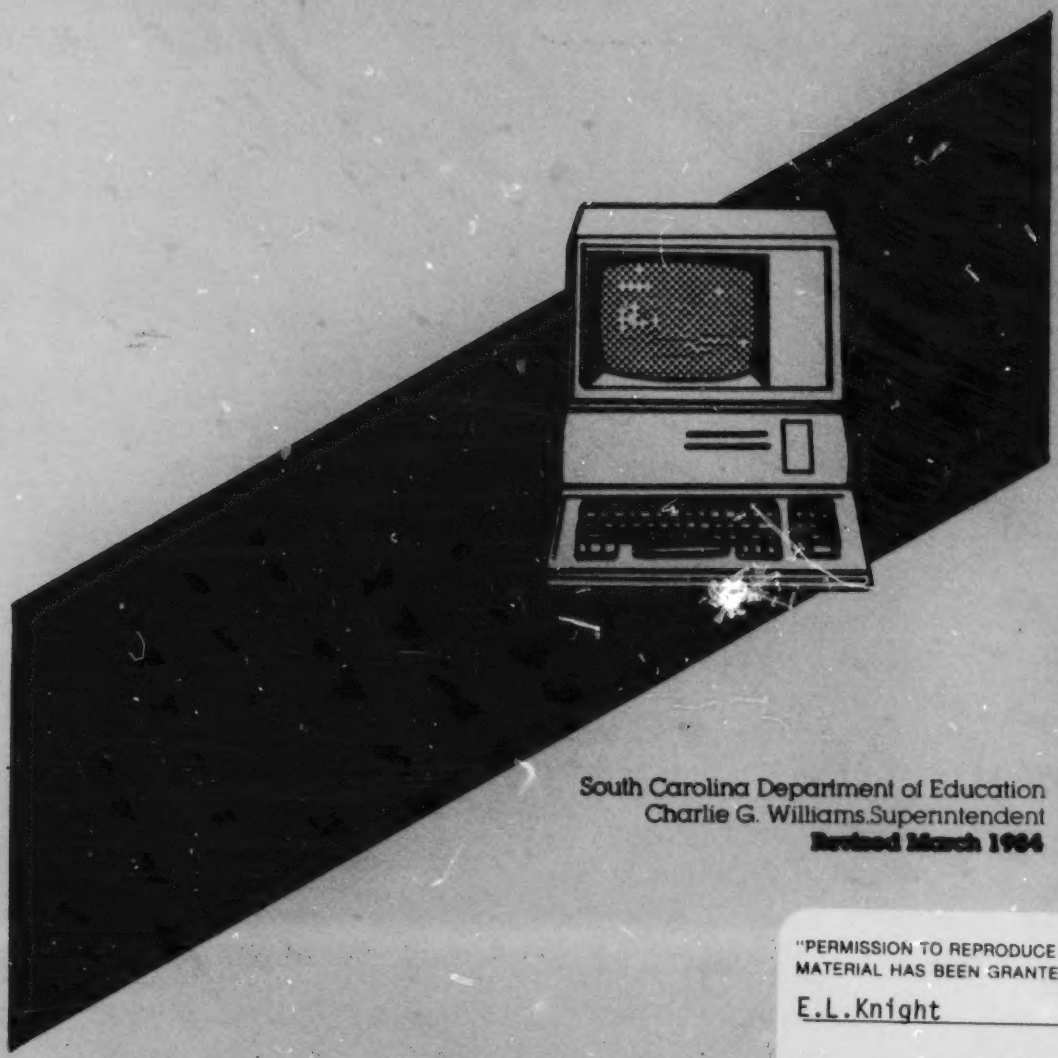
PREPARING FOR COMPUTER USE



South Carolina Department of Education
Charlie G. Williams, Superintendent

Revised March 1984

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PREPARING
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1. COURSE OUTLINES for:

   Introduction to Computers
   (A computer literacy course for students.)

   Computer Mathematics

   Advanced Placement Computer Science

   Introduction to Computers for Educators
   (A computer literacy/CAI course for instructional staff.)

2. TEACHING RESOURCES

3. SELECTED SOFTWARE SUGGESTIONS

A report from a computer education planning conference organized and conducted by the South Carolina State Department of Education with funding from Appalachia Educational Laboratory, Charleston, West Virginia, July 25-27, 1983.

INTRODUCTION

A Microcomputer Advisory Committee composed of in-state consultants, out-of-state consultants, and Department of Education personnel participated in a Microcomputer Planning Conference, July 25-27, 1983. The Conference, jointly funded by the State Department of Education and the Appalachia Educational Laboratory (AEL), convened to prepare a publication that would be of value to school districts which are developing plans for computer utilization and need assistance in designing high school credit courses, preparing staff development activities related to computer utilization, and selecting/evaluating software for instructional purposes.

This document contains the material developed by the Conference participants. It is hoped that the course outlines, recommended by the State Department of Education, and other listings will make easier the task of those responsible for incorporating computers into the classrooms of South Carolina school districts.

Recommended strategies for continuing and improving inter-district communications and for improving Department of Education leadership in the area of computer education were also developed and submitted to the Department for its consideration.

Appreciation is expressed to all Conference participants (listed elsewhere in this publication) who developed the format of this Conference report and made decisions concerning its content, to other State Department of Education personnel who attended Conference sessions and offered suggestions with respect to their areas of expertise, and to Bill Hynds, Lane Peeler, and Marie Carter for wording, editing, and typing this report.

Joel Taylor, Director
Office of General Education

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SDE/AEL Project July 25-27, 1983

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OBJECTIVES

Microcomputer Planning Conference
July 25-27, 1983

Objective 1: The Microcomputer Advisory Committee will develop a computer literacy training guide for students to be provided to districts which are acquiring microcomputers. The guide will include a suggested course outline, a description of hardware needs, suggested classroom organizations, a list of resource material (including texts) that could be utilized, and other appropriate information.

Objective 2: The Microcomputer Advisory Committee will develop a computer literacy training and staff development guide to be provided to districts which are planning to use microcomputers in education. The guide will include suggested course outlines for teachers of different levels and needs, a description of hardware needs, suggested scheduling for the training, resources available, and other appropriate information.

Objective 3: The Microcomputer Advisory Committee, together with appropriate State Department personnel, will review and select for recommendation software that would be appropriate for utilization in instruction in the basic skills areas (reading, writing, mathematics) for getting microcomputer-enhanced programs underway, including drill and practice, tutorial modes, and classroom management programs.

Objective 4: The Microcomputer Advisory Committee will develop a plan for continuing interaction and inter-district communication regarding effective microcomputer intervention in the classroom.

Objective 5: The Microcomputer Advisory Committee will develop a recommended strategy for continued efforts by the State Department of Education to address additional areas of need in microcomputer use. The recommendation will be submitted to the State Department of Education for consideration.

INTRODUCTION TO COMPUTERS

Prerequisites: None

Course Description: Introduction to Computers is designed to enable students to understand the nature of computers and their impact on society. This is accomplished through classroom discussion and "hands-on" interaction with a computer. Topics in the course include computer components and terminology, computer capabilities and limitations, computer uses and careers, and introductory programming in the BASIC language.

Allowable Credit: ½ Unit

> The outline presented below provides recommended content for this course; however, the sequencing and the necessary teaching time for each topic listed are not specified. This will allow flexibility in individual classroom situations. Student-computer interaction as early as practical in the course is recommended.

Course Outline:

1. Historical Development of Computers

   Objective: The student will be able to discuss the historical development of computers.

   - The early counting devices.
   - The generations of computers--post-1940.
   - The difference in analog and digital computers.
   - The people involved in the development of computers.

2. Computer Applications in Society

   Objective: The student will be able to discuss the widespread applications and implications of computers to today's society.

   - The uses of computers in various facets of society.
   - The growth of computer applications in the last 40 years.
   - The educational applications of computers.
   - The possible areas where computers may be used in the future.

3. Impact of Computers on Society - Careers and Job Opportunities

   Objective: The student will be able to list various careers directly related to computers and to discuss the effect of computers on job opportunities in general--past, present, and future.

   - The vocations directly related to computers.
   - The training necessary for different types of computing jobs.
   - The changes in, creation of, and elimination of various careers and occupations as a result of the use and improvement of computers.

- The current employment opportunities requiring computer expertise.
- The future implications of the effect of computers.
- The many programming languages suitable for particular applications and the training necessary for utilizing these langugaes.

4. Impact of Computers on Society - Limitations and Disadvantages

Objective: The student will be able to identify the limitations of the computer for certain applications and the potential abuse and inconvenience of computers.

- The limitations of computers for some applications.
- The limiting considerations (cost, storage capacity, software availability) for using computers.
- The use of computers for criminal actions.
- Privacy considerations concerning data bases.
- The occurrence of "computer mistakes"--their origin, the effect on the recipient, and possible procedures to correct them.
- The activities that computers can/cannot perform better than humans can.

5. Identification of Computer Hardware and Its Function

Objective: The student will be able to name the components of a computer and to discuss the function of each component.

- The components of a computer--input, output, processing, memory.
- The function of and the various devices for each of the components of a computer.
- The role each of the components plays in the problem-solving process.
- The advantages and disadvantages of different types of input and output devices.

6. Operation of Computers

Objective: The student will be able to demonstrate the ability to operate the computer.

- On/off sequences.
- Elementary keyboard functions.
- Loading and running programs (disk, tape, cartridge).
- Care of equipment and material.

7. Programming of Computers

Objective: The student will be able to create and successfully execute programs appropriate to the student's level using the BASIC language.

- Problem analysis and program development.
- Elementary BASIC programs involving:
  - assignment statements (e.g., LET)
  - system commands (e.g., RUN, LIST, NEW)
  - input techniques (e.g., INPUT, READ)
  - output techniques (e.g., PRINT)
  - unconditional branching (e.g., GOTO)
  - conditional branching (e.g., IF - THEN)
  - looping (e.g., FOR - NEXT)
- Modifying and debugging programs.
- Program storage/retrieval and output to printer.

Description of Hardware Needs: The following provides an outline of both suggested minimum and recommended hardware for the course Introduction to Computers.

Minimum Configuration
Computers with 16 K RAM, cassette recorder, monitor.

Recommended Configuration
Computers with 48K RAM and one disk drive, monitor, and one printer available.

Classroom Organization: The following provides an outline of the suggested classroom organization for the course Introduction to Computers.

1. The optimum student-to-computer ratio is two-to-one. Ratios as great as five-to-one are allowable; however, the number of students per teacher per period should not exceed 25.

2. Each individual student should have access to a computer for hands-on learning for a minimum of 100 minutes per week.

3. Computers should be housed in classroom(s) where instruction occurs.

Resources - Student Texts: The following are worthy of consideration in the selection of material for student use in the course Introduction to Computers.

Horn, Carin E. and James L. Poirot. Computer Literacy: Problem Solving with Computers. Austin, TX: Sterling Swift, 1982. (Order from: Sterling Swift, 1600 Fortview Road, Austin, TX 78704.)

Pennsylvania Department of Education. Computer Literacy - An Introductory Course. Elizabethtown, PA: Continental Press, Inc., 1982. (Order from: Continental Press, 520 East Bainbridge Street, Elizabethtown, PA 17022.)

Richman, Ellen. Spotlight on Computer Literacy. New York: Random House, Inc., 1982. (Order from: Random House, Inc., 400 Hahn Road, Westminster, MD 21157, ATTN: School Order Entry.)

COMPUTER MATHEMATICS

Prerequisite: Successful Completion of Algebra I

Course Description: Computer Mathematics, designed for students who have acquired skills in algebraic processes, includes topics that should improve student understanding of mathematics concepts and problem solving through increased knowledge of computers and computer programming. Topics include the logic of computer programming, flow charting, programming in the BASIC language, and the application of programming to problem solving using algebraic and geometric concepts. Instruction would include considerable "hands-on" interaction with computers by enrolled students.

Allowable Credit: ½ Unit

> The outline presented below provides recommended content for this course; however, the sequencing and the necessary teaching time for each topic listed are not specified. This will allow flexibility in individual classroom situations. Student-computer interaction as early as practical in the course is recommended.

Course Outline:

1. Historical Development of Computers

   Objective: The student will be able to discuss the historical development of computers.

   - The early counting devices.
   - The evolution of modern computers.
   - The contributions of mathematicians in developing computers.

2. Number Systems

   Objective: The student will be able to utilize numbers expressed in both the binary and hexadecimal number system.

   - The translation from one base to another.
   - The role of binary and hexadecimal numbers in the computer.

3. Components of a Computer

   Objective: The student will be able to name the components of a computer and to discuss the function of and terminology associated with each component.

   - The components of a computer--input, output, processing, memory.
   - The function of and the various devices for each of the components of a computer.
   - The role each of the components plays in the problem solving process.
   - The advantages and disadvantages of different types of input and output devices.

4. Strategies for Problem Solving

Objective: The student will be able to apply computer techniques to strategies for problem solving.

- Components of the problem which represent input, process, and output.
- Algorithms necessary to produce desired output.
- Pseudocodes or flow charts to represent algorithms.

5. Programming of Computers

Objective: The student will be able to create and successfully execute programs involving mathematical concepts using the BASIC language.

- BASIC commands and statements (file management and graphics optional).
- Intrinsic functions to include INT, ABS, SQR, SGN, RND, MOD, DEF FN.
- Modifying and debugging programs.
- Usage of printer.

6. Mathematical Applications - Customary Topics

Objective: The student will be able to write original programs, complete partially written programs, and determine the output or recognize errors in an existing program relating to algebraic and geometric content.

- Suggested problems:
  - evaluating numerical and algebraic expressions.
  - determining whether numerical statements are true or false.
  - determining solution sets for conditionals and compound conditionals.
  - finding distance between 2 points in a plane and in space.
  - solving equations of the form $ax + by + c = 0$.
  - finding equations of lines in a plane using slope and intercepts.
  - solving 2 x 2 systems of equations.
  - solving quadratic equations by use of the quadratic formula.
  - finding averages and standard deviation.
  - finding area of standard polygons: square, rectangle, parallelogram, triangle, trapezoid.
  - solving geometric problems using the Pythagorean relationship.
  - solving geometric problems using ratio and proportion.
  - solving geometric problems using arithmetic and geometric means.
  - factorials and combinatorial problems.
  - matrix manipulation.

7. Mathematical Applications - For Computers Only

Objective: The student will be able to write original programs to solve problems uniquely adaptable to the iterative and computational powers of the computer.

- Suggested problems:
  - series approximations for π and e.
  - approximating area under a curve.
  - Newton-Raphson method for extracting square root.
  - amortization and compound interest.
  - Euclidean algorithm for GCD.
  - approximation of real roots of polynomial equations.
  - Monte-Carlo method for computing area or π.

Description of Hardware Needs: The following provides an outline of the suggested minimum hardware for the course Computer Mathematics.

Minimum Configuration

Computers with 48K RAM and one disk drive, monitor, and one printer per classroom.

Classroom Organization: The following provides an outline of the suggested classroom organization for the course Computer Mathematics.

1. The optimum student-to-computer ratio is two-to-one. Ratios as great as five-to-one are allowable; however, the number of students per teacher per period should not exceed 25.

2. Each individual student should have access to a computer for hands-on learning for a minimum of 100 minutes per week.

3. Computers should be housed in the classroom(s) where instruction occurs.

Resources - Student Texts: The following are worthy of consideration in the selection of material for student use in the course Computer Mathematics.

Elgarten, Posamentier, Moresh. Using Computers in Mathematics. Reading, MA: Addison-Wesley Publishing Company. (Order from: Addison-Wesley Publishing Company, Inc., 120 Interstate North Parkway, East, Suite 168, Atlanta, GA 30339.)

Golden, Neil. Computer Programming in the BASIC Language. New York: Harcourt Company, 1981. (Order from: Harcourt Brace Jovanovich, Inc., 1372 Peachtree Street, N.E., Atlanta, GA 30309.)

Poirot, James. Computers and Mathematics. Austin, TX: Sterling Swift Publishing Company. (Order from: Sterling Swift, 1600 Fortview Road, Austin, TX 78704.)

ADVANCED PLACEMENT COMPUTER SCIENCE

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It is recommended that districts proposing to offer Advanced Placement Computer Science obtain the following College Entrance Examination Board publications so that appropriate and adequate preparation will precede the introduction of the course into the curriculum.

Advanced Placement Course Description, Computer Science ($5.00)
Teacher's Guide: AP Computer Science ($5.00)

Order from: Advanced Placement Program
Box 2899
Princeton, New Jersey 08541

The goals of an Advanced Placement Computer Science course are comparable to those of a first-year course offered in college and university computer science departments. Thus, an AP course in computer science will cover topics that would normally comprise six or more semester hours of college-level computer science course work that could be credited toward a computer science major.

It is not expected that all students in an AP Computer Science course will major in computer science at the university level. The course is intended to serve both as an introductory course for computer science majors and as a substantial service course for people who will major in other disciplines that require significant involvement with computing. Because of the diversity of first-year computer science courses currently offered by colleges and universities, the outline of topics described here may not match any one course exactly. However, the content of the outline is consistent with the direction in which these courses are evolving and with the curricular recommendations of the Association for Computing Machinery (ACM) and the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE). (See [20] and [21].)*

An AP Computer Science course can be offered by any secondary school that has faculty who possess the necessary expertise and that has access to appropriate computing facilities. This course will not necessarily be the student's first course in computing, although it is designed so that it could be. It should be emphasized that this course represents college-level achievement for which colleges and universities can be expected to grant (1) advanced placement within their sequence of computer science courses and (2) credit toward a computer science or other degree, such placement and credit to depend on the extent of the entering student's preparation as measured by the results of the Advanced Placement Examination. Appropriate placement and credit will be granted by institutions in accordance with their own policies.

TEACHERS OF THE COURSE

The teacher should be prepared to present a college-level first course in computer science. The AP course in computer science is more than a traditional programming

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* Bracketed numbers such as these refer to entries in the reference section given at the end of this section.

course. Its emphasis is on programming methodology, algorithms, and data structures rather than the specifics of coding in a particular language. At this time, it is not expected that many secondary schools will have faculty members possessing a strong background in computer science. Even teachers with considerable experience in computer programming may need further study to prepare themselves to offer this course.

Teachers who do not presently feel prepared to teach this course should not be discouraged. They may wish to follow a program of self-instruction or acquire further education. It is expected that special teacher-training institutes will be offered for this course. Teachers can also expect to strengthen their background in the course material by working with their students. Involving students in developing and presenting certain topics can make use of an often untapped resource.

STUDENT PREREQUISITES

The necessary prerequisites for entering an AP Computer Science course include a familiarity with mathematical notation at the level of a second course in algebra, experience in problem-solving, and an appreciation of the need to structure and develop a given topic in a logical manner. Knowledge of any particular mathematical notation is less important than an attitude toward notation that reflects a well-founded confidence that unfamiliar symbolism can be mastered and will eventually serve as an aid to understanding. Mathematics courses have traditionally offered the secondary-school student the best available opportunity to acquire such an attitude. It is important that secondary-school students and their advisers understand that any significant computer science course builds upon a foundation of mathematical reasoning that should be acquired prior to attempting such a course. Therefore, a computer science course is neither a substitute for the usual college-preparatory mathematics courses nor a substitute for a course in calculus.

The curricular organization necessary to prepare students to enter an AP Computer Science course is compatible with that recommended to prepare students for the Advanced Placement courses in calculus; any school currently offering such courses need make few if any changes in the organization of its curriculum. It should be emphasized, however, that calculus is not a prerequisite for an AP Computer Science course. In fact, no relationship need exist between Advanced Placement offerings in calculus and computer science.

One prerequisite for an AP Computer Science course, competence in written communication, deserves special attention. Documentation plays a central role in the programming methodology that forms the heart of an AP Computer Science course, and students should have already acquired facility in written communication before entering such a course. The course will provide continuing opportunity to apply and further develop writing skills, but the teacher of an AP Computer Science course will not have the time to teach basic writing skills.

EQUIPMENT

The minimum computing facilities available to a school that plans to offer an AP Computer Science course can vary somewhat according to whether the school uses either a time-sharing service or its own microcomputers or larger machine. Although it is conceivable that the AP course outlined here could be conducted without students having access to interactive facilities (and instead using batch processing facilities), such an arrangement would be, at best, less than desirable.

Microcomputers are acceptable, but they should be used in conjunction with disk storage rather than with unacceptably slow tape storage. If the language system of the microcomputer is too large to fit on one of the available disks, then two disk drives for each microcomputer would probably be necessary to avoid the undesirable delays involved in repeated removal and insertion of the various disks.

Another necessary ingredient of the system would be the availability of permanent, secure files where students could store their programs and/or data and from which the contents could be accessed both by the student and by the student's programs. A printer would be necessary so that listings of programs, files, and program outputs could be examined off line.

In the case of interactive facilities, there should be enough terminals to allow each student in the course a minimum equivalent of 30 minutes per day alone on a terminal, five days a week, throughout the academic year. This time can be made available at any time during the school day and need not be made available to all students in the AP course simultaneously. For example, two computer terminals could satisfy this requirement for 32 students during an eight-hour school day. In the cases where several terminals access the same central unit, there should not be so many terminals in the system that response time becomes unacceptably long.

COMPUTER LANGUAGE

A primary objective of an AP Computer Science course is to teach students how to write logically structured, well-documented computer programs. While good programmers can write such programs in almost any programming language, certain languages encourage good programming habits more than others; the AP Computer Science course will require use of such a language. The language must have certain technical characteristics that facilitate structured programming and a high degree of modularity. These include the **if-then-else** flow control construct, the **while-do** looping construct, data typing, and independent procedures. These procedures must allow utilization of parameters, declaration of local variables, and access to global variables. It should be possible to pass parameters both by reference and by value. Recursion and dynamic allocation of storage are necessary features.

A consideration of the features of various programming languages, together with the support provided for these languages by existing textbooks and by computer systems commonly available at the secondary-school level, led to the selection of Pascal as the sole language to be used in the AP Computer Science Examination at this time. That selection was made even though, in isolated instances, the goals of an AP Computer Science course could be accomplished in an existing secondary-school computing environment with a language other than Pascal. However, the chances seemed too great that a large number of secondary schools might try to teach such a course with a less-than-adequate language and with negative consequences for their students taking the AP Computer Science Examination. Consequently, it was decided that the interests of all students who will take the AP Computer Science Examination are best served by being possibly too restrictive rather than being too permissive.

Although the initial offerings of the AP Computer Science Examination will require the use of Pascal, later offerings may permit the use of other languages as well. Pascal will remain an acceptable language, but as other languages with appropriate features become more widely available at the secondary-school level and are supported by published texts, these languages too may become acceptable for an AP course.

Although the programming language BASIC now enjoys wide use at the secondary-school level, there are a number of reasons why the commonly available versions of BASIC are NOT acceptable vehicles for an AP course.

Most versions of BASIC have many inadequacies, and no attempt will be made to illustrate them all; but two examples should serve to indicate the kinds of shortcomings that permeate BASIC. In Pascal it is easy to distinguish the loop

```
while x < y do x := 2*x
```

which doubles a quantity x repeatedly until the resulting quantity either equals or exceeds a quantity y, from the conditional

```
if x < y then x := 2*x
```

which simply doubles x once if it is less than y and does nothing otherwise. In standard BASIC, these constructs are expressed indirectly and are harder to distinguish. For example,

```
100 IF X >= Y THEN 200
110 LET X = 2*X
120 GOTO 100
```

performs the same task as the Pascal loop displayed above, but it differs from

```
100 IF X >= Y THEN 200
110 LET X = 2*X
```

only by the omission of one out of three lines, and from

```
100 IF X >= Y THEN 200
110 LET X = 2*X
120 GOTO 200
```

only by what might appear to be a superficial change in one of three lines; yet, in the absence of other GOTO statements, the latter two sequences of statements perform a different task entirely--they form a conditional structure rather than a loop. The experienced teacher of BASIC can easily imagine further complexities that would be introduced if there were other GOTO statements leading out of the body of the loop; the ease with which one may write a program that is totally incomprehensible, even to its author, quickly becomes obvious in such situations.

As a second example, most versions of BASIC that are widely available on personal computers do not provide a mechanism for passing parameters to subroutines, thereby limiting severely the usefulness of these versions for modular programming. Some dialects of BASIC do possess features akin to those of Pascal, but those dialects having at least the minimum features required for an AP course are not commonly available and are not supported by published texts.

THE COURSE

The major emphasis in an AP Computer Science course is on programming methodology, algorithms, and data structures. Applications of computing provide the context in which these subjects are treated. Applications are used to develop student awareness of the need for particular algorithms and data structures, as well as to provide topics for programming assignments to which students can apply their knowledge. A particular programming language constitutes the vehicle for implementing computer-based solutions to particular problems. Treatments of computer systems and the social implications of computing are integrated into the course and not isolated as separate units.

Course Goals

1. The student will be able to design and implement computer-based solutions to problems in several application areas.

2. The student will learn well-known algorithms and data structures.
3. The student will be able to develop and select appropriate algorithms and data structures to solve problems.
4. The students will be able to code fluently in a well-structured fashion using an accepted high-level language. (The first offerings of the AP Computer Science Examination will require knowledge of Pascal.)
5. The student will be able to identify the major hardware and software components of a computer system, their relationship to one another, and the roles of these components within the system.
6. The student will be able to recognize the ethical and social implications of computer use.

Topic Outline

The following topic outline necessarily contains technical terminology. Readers who have not yet reached a level of expertise sufficient to understand all of the terminology in this section may be aided by reading the Commentary on the Course Description near the end of this booklet*; but a brief study of some computer science texts employing such terminology would be an even better aid.

A. Programming Methodology

1. Specification
   a. Problem definition and requirements
   b. Functional specifications for programs
2. Design
   a. Modularization
   b. Top-down versus bottom-up methodologies
   c. Stepwise refinement of modules and data structures
3. Coding
   a. Structure
   b. Style, clarity of expression
4. Program correctness
   a. Testing
      i. Relation to design and coding
      ii. Generation of test data
      iii. Top-down versus bottom-up testing of modules
   b. Verification
      i. Assertions and invariants
      ii. Reasoning about programs
   c. Debugging
5. Documentation

B. Features of Programming Languages

1. Types and declarations
   a. Block structure
   b. Scope of identifiers
      i. Local identifiers
      ii. Global identifiers
2. Data
   a. Constants
   b. Variables

* The Commentary is found on pages 31-50 of Advanced Placement Course Description, Computer Science from which this reprint is taken.

3. Expressions and assignments
   a. Operators and operator precedence
   b. Standard functions
   c. Assignment statements
4. Control structures
   a. Sequential execution
   b. Conditional execution
   c. Iteration (loops or repetitive execution)
5. Input and output
   a. Terminal input and output
   b. File input and output
6. Procedures
   a. Subroutines and functions
   b. Parameters
      i. Actual and formal parameters
      ii. Value and reference parameters
   c. Recursive procedures
7. Program annotation
   a. Comments
   b. Indentation and formatting

C. Data Types and Structures

1. Primitive data types
   a. Numeric data
      i. Floating-point real numbers
      ii. Integers
   b. Character (symbolic) data
   c. Logical (Boolean) data
2. Linear data structures
   a. Arrays
   b. Strings
   c. Linked lists
   d. Stacks
   e. Queues
3. Tree structures
   a. Terminology
      i. Nodes: root, leaf, parent, child, sibling
      ii. Branches and subtrees
      iii. Ordered and unordered trees
   b. Binary trees
   c. General tree structures (optional)
4. Representation of data structures
   a. Sequential representation of linear structures
   b. Pointers and linked data structures

D. Algorithms

1. Classes of algorithms
   a. Sequential algorithms
   b. Iterative or enumerative algorithms
   c. Recursive algorithms

2. Searching
   a. Sequential (linear) search
   b. Binary search
   c. Hash-coded search
   d. Searching an ordered binary tree
   e. Linear versus logarithmic searching times
3. Sorting
   a. Selection sort
   b. Insertion sort
   c. Exchange or bubble sort
   d. Merge sort
   e. Sorting using an ordered binary tree
   f. Quicksort (optional)
   g. Radix sort (optional)
   h. Quadratic versus n*log(n) sorting times
4. Numerical algorithms
   a. Approximations
      i. Zeroes of functions by bisection
      ii. Monte-Carlo techniques
      iii. Area under a curve (optional)
   b. Statistical algorithms
      i. Measures of central tendency
      ii. Measures of dispersion
   c. Numerical accuracy
      i. Round-off effects
      ii. Precision of approximations
5. Manipulation of data structures
   a. String processing
      i. Concatenation
      ii. Substring extraction
      iii. Matching
   b. Insertion and deletion in linear structures, trees
   c. Tree traversals

E. Applications of Computing

1. Text processing
   a. Editors
   b. Text formatters
2. Simulation and modeling
   a. Continuous simulation of physical processes
   b. Discrete simulation of probabilistic events
3. Data analysis
   a. Statistical packages
   b. Graphical display of data
4. Data management
   a. Information storage and retrieval
   b. Typical business systems
5. System software and graphics
   a. File management routines (e.g., mail systems)
   b. Syntax analysis routines
      i. Command scanners
      ii. Evaluation of arithmetic expressions
   c. Graphical software

6. Games
   a. Simple puzzles (e.g., Tower of Hanoi)
   b. Simple games (e.g., tic-tac-toe)
   c. Searching game trees (optional)

F. Computer Systems

1. Major hardware components
   a. Primary and secondary memory
   b. Processors
   c. Peripherals
2. System software
   a. Language processors
   b. Operating systems
   c. Graphical output facilities
3. System configuration
   a. Microprocessor systems
   b. Time-sharing and batch processing systems
   c. Networks

G. Social Implications

1. Responsible use of computer systems
2. Social ramifications of computer applications
   a. Privacy
   b. Values implicit in the construction of systems
   c. Reliability of systems

Note. Thorough coverage of topics E, F, and G would require more time than is available in a single course. In an AP Computer Science course, a minimum treatment of these topics would consist of the following. For topic E, simple examples of the applications listed in the topic outline should be studied in order to acquaint students with the general nature of these applications and to introduce students to the data structures and algorithms inherent in these applications. (See the Commentary on the Course Description for a further elaboration.) For topic F, a working knowledge of the major hardware and software components of computer systems should be developed, although the operation of these components need not be studied in detail. For topic G, the importance of considering the ethical and social implications of computing systems should be stressed throughout the course, although no systematic coverage of these implications is required.

[20] "Curriculum '78. Recommendations for the undergraduate program in computer science." Communications of the Association for Computing Machinery, Vol. 22, No. 3, March 1979, pp. 147-166. Describes the role of SE-1 and SE-2 in the undergraduate computer science and engineering curriculum.

[21] IEEE Computer Society. A Curriculum in Computer Science and Engineering, IEEE Computer Society Education Committee Report (Rev. 1), November 1976. Describes the role of SE-1 and SE-2 in the undergraduate computer science and engineering curriculum.

INTRODUCTION TO COMPUTERS FOR EDUCATORS

Course Description: Introduction to Computers for Educators is designed to enable teachers and other instructional personnel to understand the nature of computers, their impact on society, and their proper use in instructional settings. This is accomplished through discussion and "hands-on" interaction with a computer. Topics in the course include evaluation, selection and utilization of courseware, computer components and terminology, computer capabilities and limitations, computer use and careers, and introductory programming in the BASIC language.

Recommended Credit: 3 Semester Hours

> The outline presented below provides recommended content for this course; however, the sequencing and the necessary teaching time for each topic listed are not specified. This will allow flexibility in individual classroom situations. Student-computer interaction as early as practical in the course is recommended.

Course Outline:

A. Awareness

1. Historical Development of Computers

   Objective: The participant will be able to discuss the historical development of computers.

   - The early counting devices.
   - The generations of computers--post-1940.
   - The difference in analog and digital computers.
   - The people involved in the development of computers.

2. Computer Applications in Society

   Objective: The participant will be able to discuss the widespread applications and implications of computers to today's society.

   - The uses of computers in various facets of society.
   - The growth of computer applications in the last 40 years.
   - The educational applications of computers.
   - The possible areas where computers may be used in the future.

3. Impact of Computers on Society - Careers and Job Opportunities

   Objective: The participant will be able to list various careers directly related to computers and to discuss the effect of computers on job opportunities in general--past, present, and future.

   - The vocations directly related to computers.
   - The training necessary for differenct types of computing jobs.
   - The changes in, creation of, and elimination of various careers and occupations as a result of the use and improvement of computers.

- The current employment opportunities requiring computer expertise.
- The future implications of the effect of computers.
- The many programming languages suitable for particular applications and the training necessary for utilizing these languages.

4. Impact of Computers on Society - Limitations and Disadvantages

Objective: The participant will be able to identify the limitations of the computer for certain applications and the potential abuse and inconvenience of computers.

- The limitations of computers for some applications.
- The limiting considerations (cost, storage capacity, software availability) for using computers.
- The use of computers for criminal actions.
- Privacy considerations concerning data bases.
- The occurrence of "computer mistakes"--their origin, the effect on the recipient, and possible procedures to correct them.
- The activities that computers can/cannot perform better than humans can.

5. Identification of Computer Hardware and Its Function

Objective: The participant will be able to name the components of a computer and to discuss the function of each component.

- The components of a computer--input, output, processing, memory.
- The function of and the various devices for each of the components of a computer.
- The role each of the components plays in the problem-solving process.
- The advantages and disadvantages of different types of input and output devices.

B. Instructional Applications

1. Operation of Computers

Objective: The participant will be able to demonstrate the ability to operate the computer.

- On/off sequences.
- Elementary keyboard functions.
- Loading and running programs (disk, tape, cartridge).
- Care of equipment and material.

2. Software Considerations

Objective: The participant will be able to evaluate and utilize appropriate software for instructional purposes.

- Evaluation and selection of instructional software.
- Modes of instruction in software utilization.
- Integration of software into the school curriculum.
- Classroom management.
- Teacher utilities (e.g., grades and record keeping).
- Sources of software.

C. Programming of Computers

Objective: The participant will be able to create and successfully execute programs appropriate to the participant's instructional level using the BASIC language.

- Problem analysis and program development.
- Elementary BASIC programs involving:
  - assignment statements (e.g., LET).
  - system commands (e.g., RUN, LIST, NEW).
  - input techniques (e.g., INPUT, READ).
  - output techniques (e.g., PRINT).
  - unconditional branching (e.g., GOTO).
  - conditional branching (e.g., IF - THEN).
  - looping (e.g., FOR - NEXT).
- Modifying and debugging programs.
- Program storage/retrieval and output to printer.

Description of Hardware Needs: The following provides an outline of both suggested minimum and recommended hardware for the course Introduction to Computers for Educators.

Minimum Configuration
Computers with 48K RAM and one disk drive, monitor, and one printer per classroom.

Recommended Configuration
Above configuration with color monitor.

Classroom Organization: The following provides an outline of the suggested classroom organization and schedule for the course Introduction to Computers for Educators.

1. The participant-to-computer ratio should not exceed two-to-one.

2. A concentrated three-week summer course which meets 15 hours per week is recommended. Other schedules may be used if necessary.

Resources - Texts: The following are worthy of consideration in the selection of text material for use in the course Introduction to Computers for Educators.

*Horn, Carin E. and James L. Poirot. Computer Literacy: Problem Solving with Computers. Austin, TX: Sterling Swift, 1982. (Order from: Sterling Swift, 1600 Fortview Road, Austin, TX 78704.)

Pennsylvania Department of Education. Computer Literacy - An Introductory Course. Elizabethtown, PA: Continental Press, Inc., 1982. (Order from: Continental Press, 520 East Bainbridge Street, Elizabethtown, PA 17022.)

Richman, Ellen. Spotlight on Computer Literacy. New York: Random House, Inc., 1982. (Order from: Random House, Inc., 400 Hahn Road, Westminster, MD 21157, ATTN: School Order Entry.)

RESOURCES - GENERAL

Billings, Karen and David Moursund. Are You Computer Literate? Forest Gove, OR, Dilithium Press, 1979. (Order from: Dilithium Press, P. O. Box 606, Beaverton, OR 97075.)

Graham, Neill. The Mind Tool: Computers and Their Impact on Society. 2nd Edition. St. Paul, MN: West Publishing Company, 1980. (Order from: West Publishing Company, P. O. Box 3526, St. Paul, MN 55165.)

Spence, Donald D. Exploring the World of Computers. Ormond Beach, FL: Camelot Publishing Company. (Order from: Camelot Publishing Company, P. O. Box 1357, Ormond Beach, FL 32074.)

Vocational Curriculum Development Section. Computer Literacy. Office of Vocational Education, State Department of Education, 1983. (Order from Dr. Anne Matthews, Chief Supervisor, Program Planning and Development, 904 Rutledge Bldg., Columbia, SC 29201.)

Sound Filmstrips:

Computers: From Pebbles to Programs (Computer Literacy: History and Applications in Society), Guidance Associates, 1975. $109.50.

BASIC: An Introduction to Computer Programming, Guidance Associates, 1981. $139.80.

(Order both of the above from: Guidance Associates, Communications Park, Box 3000, Mount Kisco, NY 10549.)

Computer Programming, Educational Activities, 1979. $89.00. (Order from: Educational Activities, Inc., 1937 Grand Avenue, Baldwin, NY 11510.)

Magazines:

Classroom Computer News P. O. Box 266 Cambridge, Massachusetts 02141	$12.00, 6 issues
The Computing Teacher Computing Center Eastern Oregon State College LeGrande, Oregon 97850	$14.50, 9 issues ($2.50 handling)
Electronic Education Electronic Communications, Inc. Suite 220 1311 Executive Center Drive Tallahassee, Florida 32301	$10.00, 10 issues
Electronic Learning 902 Sylvan Avenue Englewood Cliffs, New Jersey 07632	$19.00, 8 issues
Creative Computing P. O. Box 789-M Morristown, New Jersey 07960	$20.00, 12 issues

RESOURCES - PROGRAMMING

Albrecht, Inman, Zamora. TRS 80 BASIC: A Self-Teaching Guide. New York: John Wiley and Sons, 1980.

Albrecht, Inman, Zamora. Advanced TRS 80 BASIC: A Learning Guide. New York: John Wiley and Sons, 1981.

(Order both of the above from: A Radio Shack Computer Center.)

Dwyer, F. and M. Critchfield. A Bit of BASIC. Reading, MA: Addison-Wesley Publishing Company, 1980. (Order from: Addison-Wesley Inc., 120 Interstate North Parkway, East, Suite 168, Atlanta, GA 30339.)

Luehrmann, Arthur and Herbert Peckman. Computer Literacy - A Hands-On Approach for the Apple. New York: McGraw-Hill, 1983. (Order from: Webster Division, McGraw-Hill Book Company, P. O. Box 948, Norcross, GA 30091.)

Poole, McNiff, Cook. Apple II User's Guide. Berkeley, CA: Osborne/McGraw-Hill. (Order from: Osborne/McGraw-Hill, 630 Bancroft Way, Berkeley, CA 94710.)

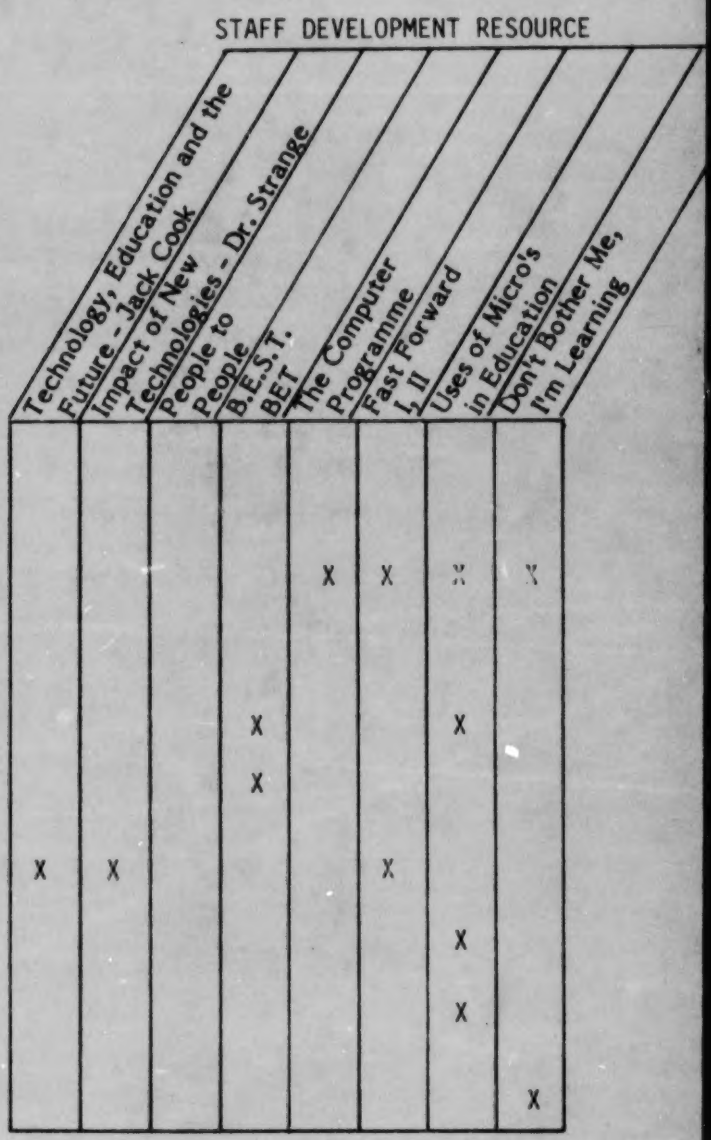
Presley, Bruce. A Guide to Programming in Applesoft and A Guide to Programming in BASIC-Plus and A Guide to Programming in Level II BASIC. New York: Van Nostrand Reinhold, 1982. (Order from: Van Nostrand Reinhold, Inc., 76 25 Empire Drive, ATTN: Department T, Florence, KY 41042.)

ITV & RADIO RESOURCES
for K-12 Computer Education*

Courses or Topics	ITV SERIES: Computer and the Crook	Don't Bother Me I'm Learning	Fast Forward I, II	Computer Programme	Adventures of the Mind
I. Introduction to Computers for Educators (Grades 6-12)					
• 4 Basic Parts of Computers			X	X	
• Input/Output Devices			X	X	X
• History of Computers			X	X	
• Computer Use and Careers in our Society			X	X	X
II. Social Studies (Grades 6-8)					
• Technology in Today's Society			X		
III. Computer Literacy (Grades 1-6)	X	X			

* See 1983-84 ITV/Radio Resource Book for descriptions and broadcast schedules.

ITV & RADIO RESOURCES
for Staff Development*


STAFF DEVELOPMENT RESOURCE
Technology, Education and the Future - Jack Cook
Impact of New Technologies - Dr. Strange
People to People
B.E.S.T. BET
The Computer Programme
Fast Forward I, II
Uses of Micro's in Education
Don't Bother Me, I'm Learning

Course or Topics	Technology, Education and the Future - Jack Cook	Impact of New Technologies - Dr. Strange	People to People	B.E.S.T. BET	The Computer Programme	Fast Forward I, II	Uses of Micro's in Education	Don't Bother Me, I'm Learning
I. Introduction to Computers for Educators								
• Computer Literacy					X	X	X	X
II. General Topics								
• Using Computers in Education				X			X	
• Planning for Use of Computers				X				
• Impact of Technological Trends on Education	X	X				X		
• Training Personnel							X	
• Microcomputer Hardware, Software							X	
• Microcomputers in the Community								X

* See 1983-84 ITV/Radio Staff Development Catalog for descriptions and broadcast schedules.

EDUCATIONAL SOFTWARE SELECTION

The pages which follow have been reprinted with permission from The 1983 Educational Software Preview Guide developed at the California Software Evaluation Forum, Vallombrosa Center, Menlo Park, California, January 17-19, 1983. School district personnel planning to use the attached information should be cognizant at all times of the following:

1. The information provided should not be considered as an endorsement of the products for purchase without careful examination. A software evaluation checklist, reprinted with permission from NCTM, is included as the final page of this document.

2. The purpose of the guide is solely to make educators aware of available software from various publishers in several subject areas. The software listed has been favorably previewed by educators.

3. An addendum developed during the Microcomputer Planning Conference, conducted by the South Carolina State Department of Education, July 25-27, 1983, contains additional software references which committee members felt should be included as additional information.

THE 1983 EDUCATIONAL SOFTWARE PREVIEW GUIDE

developed by the

EDUCATIONAL SOFTWARE EVALUATION CONSORTIUM

at the

CALIFORNIA SOFTWARE EVALUATION FORUM
VALLOMBROSA CENTER, MENLO PARK, CALIFORNIA
JANUARY 17-19, 1983

The 1983 Educational Software Preview Guide is a list of favorably reviewed microcomputer software. The Preview Guide has been developed by the Educational Software Evaluation Consortium, representing 17 organizations involved in computer education throughout North America. The Preview Guide is designed to assist educators in locating software for preview; it is not intended to endorse these products for purchase without examination.

The selection of titles in this guide is based on critical evaluations conducted by the participating organizations and on discussion among the Educational Software Evaluation Consortium representatives who attended the California Software Evaluation Forum, supplemented by reference to reviews published in professional journals. The absence of a title from this list is not to be interpreted as a negative judgment. Many excellent packages, including ones recently published, may not have been widely reviewed by the time of this Forum. Other titles may be suitable for applications not included within the scope of this project, which is limited to instructional software for K-12 classroom use.

Placement of a title into a specific subject area, grade level, and instructional mode classification reflects the best judgment of the Consortium participants. An additional consideration for interpreting this list is that a given product is often available on several different brands of microcomputers, and its quality may vary considerably from one computer to another.

The California Software Evaluation Forum, at which this Educational Software Evaluation Consortium was formed, was sponsored by the TEC Center Software Library & Clearinghouse in the San Mateo County Office of Education. The California State Department of Education has funded this statewide Software Library & Clearinghouse as part of the California TEC (Teacher Education & Computer) Center program. Development of the 1983 Educational Software Preview Guide was one of the major purposes of the California Software Evaluation Forum.

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EDUCATIONAL SOFTWARE EVALUATION CONSORTIUM

ARIZONA STATE UNIVERSITY MICROCOMPUTER RESEARCH CLINIC
- Gary Bitter
- Ruth Camuse
- Marilyn Sue Ford

CALIFORNIA LIBRARY MEDIA CONSORTIUM FOR CLASSROOM EVALUATION OF MICROCOMPUTER COURSEWARE
- Ann Lathrop

COMPUTER-USING EDUCATORS (CUE)
- LeRoy Finkel
- Glenn Fisher
- Bobby Goodson
- Jim McCauley
- Sandy Wagner

COMP-YOU-TER PROJECT, TITLE IV-C, WATERTOWN, SOUTH DAKOTA
- Pat Johnson

DISC PROJECT; IICD-OAKLAND SCHOOLS
- Carol Klenow
- Shelley Yorke Rose

EDUCATIONAL PRODUCTS INFORMATIONAL EXCHANGE (EPIE)
- Jim Dunne

EVALUATIONS: MICROWARE - PROVINCIAL EDUCATIONAL MEDIA CENTRE, BRITISH COLUMBIA
- Gayle Long

FLORIDA CENTER FOR INSTRUCTIONAL COMPUTING
- Sandra Turner
- Pristen Bird, Florida Department of Education, Educationai Technology

MICHIGAN ASSOCIATION FOR COMPUTER USERS IN LEARNING (MACUL)
- Jim Winebrener

MICROCOMPUTERS IN EDUCATION - ROBBINSDALE AREA SCHOOLS TITLE IV-C PROJECT
- Bill Heck

MICRO-IDEAS
- Fred Bockmann

MICROSIFT
- Don Holznagel

MINNESOTA EDUCATIONAL COMPUTING CONSORTIUM (MECC)
- Karen Jostad

NORTH CAROLINA STATE DEPARTMENT OF PUBLIC INSTRUCTION, DIVISION OF EVALUATION SERVICES
John C. Brim

PUTNAM/NORTHERN WESTCHESTER BOCES (NEW YORK)
Walter Koetke

TEXAS TABS (TEXAS ASSESSMENT OF BASIC SKILLS) PROJECT; REGION IV
Dede Heidt (Fort Bend ISD)

TOTAL INFORMATION EDUCATIONAL SYSTEMS (TIES)
Sue Talley

For information please contact:
Ann Lathrop
California TEC Center Software Library & Clearinghouse
SMERC Library
San Mateo County Office of Education
333 Main Street
Redwood City, CA 94063

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JANUARY 17-19, 1983

ART PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
AESTHEOMETRY	MECC	AP			X	X	PS,TU
ART - PERSPECTIVE DRAWING	MECC	AP			X	X	DP,TU
MATCH GAME	TCH TOOLS	AP,PE	X	X	X		EG,UT
ROCKY'S BOOTS	TLC	AP		X	X	X	EG,PS

MUSIC PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ARNOLD	MICRO MUS	AP		X	X	X	DP
DOREMI	MICRO MUS	AP		X	X	X	DP
INTERVAL MANIA	MICRO MUS	AP		X	X	X	DP
MELODIOUS DICTATOR	MICRO MUS	AP		X	X	X	DP,PS
MUSIC COMPOSER	MICRO MUS	AP				X	AU
MUSIC THEORY	MECC	AP,PE,IBM,TR	X	X	X	X	DP
SIR WILLIAM WRONG NOTE	MICRO MUS	AP				X	DP,PS

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SCIENCE PROGRAMS - BIOLOGY

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
BIRDFEED	EDUTECH	AP			X	X	SI
ODELL LAKE (ELEMENTARY BIOLOGY)	MECC	AT,PE,IBM,TR		X	X		SI
ODELL LAKE (SCIENCE VOL. 3)	MECC	AP		X	X		SI
POP (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP				X	SI
RATS (ECOLOGY SIMULATIONS 2)	CRE CMP	AP,PE,TR				X	SI
STERL (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP			X	X	SI

SCIENCE PROGRAMS - CHEMISTRY

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
CHEM LAB SIMULATION #1	HIGH TECH	AP			X	X	SI
HABER	CONDUIT	AP,TR				X	SI

SCIENCE PROGRAMS - EARTH SCIENCE

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
GEOLOGY SEARCH	MCGRAW-HILL	AP,TR			X	X	SI
MINERALS (EARTH SCIENCE)	MECC	AT,PE,IBM			X	X	PS
MINERALS (SCIENCE VOL. 3)	MECC	AP			X	X	PS
QUAKES (EARTH SCIENCE)	MECC	AT,PE,IBM,TR				X	SI
QUAKES (SCIENCE VOL. 3)	MECC	AP				X	SI
SOLAR DISTANCE (EARTH SCIENCE)	MECC	AT,PE,IBM,TR			X	X	PS
SOLAR DISTANCE (ELEM. VOL. 4)	MECC	AP			X	X	PS
URSA (EARTH SCIENCE)	MECC	AT,PE,IBM,TR		X	X	X	DP
URSA (ELEMENTARY VOL. 4)	MECC	AP		X	X	X	DP
VOLCANOES	EARTHWARE	AP				X	SI

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SCIENCE PROGRAMS - ENVIRONMENT

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ECOLOGY SIMULATIONS 2	CRE CMP	AP,TR,PE			X	X	SI
ODELL LAKE (ELEMENTARY BIOLOGY)	MECC	AT,PE,IBM,TR		X	X		SI
ODELL LAKE (SCIENCE VOL. 3)	MECC	AP		X	X		SI
STERL (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP			X	X	SI
TAG (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,AP,PE			X	X	SI

SCIENCE PROGRAMS - PHYSICS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
APPROXIMATE MEASUREMENT 2	SCH COUR J	AP,PE,TR		X			DP
COLLIDE (SCIENCE VOL. 2)	MECC	AP			X	X	SI
NEWTON 2 (SCIENCE VOL. 1)	MECC	AP				X	PS
PHYSICS COMPULAB	EDUTECH	AP				X	DI
SNELL (SCIENCE VOL. 2)	MECC	AP				X	SI
THREE MILE ISLAND	MUSE	AP				X	SI

SOCIAL STUDIES - HISTORY

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
BUFFALO (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,AP,PE			X	X	SI
MEET THE PRESIDENTS	VERSA	AP		X	X		DP
OREGON (ELEMENTARY VOL. 6)	MECC	AP,PE,IBM,TR		X	X		SI
TRAIL WEST	MICRO-ED	PE		X			SI

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SOCIAL STUDIES - GOVERNMENT

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
PRESIDENT ELECT	STRAT SIM	AP			X	X	SI

SOCIAL STUDIES - ECONOMICS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
CARTELS & CUTTHROATS	STRAT SIM	AP				X	SI
MARKETPLACE	MECC	AT,PE,IBM,TR		X	X		SI
SELL APPLES (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR		X	X		SI
SELL BICYCLES (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR		X	X		SI
SELL LEMONADE (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR		X	X		SI
SELL PLANTS (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR		X	X		SI

SOCIAL STUDIES - ENVIRONMENT

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ECOLOGY SIMULATIONS 2	CRE CMP	AP,TR,PE			X	X	SI
STERL (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP			X	X	SI

SOCIAL STUDIES - GEOGRAPHY

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
GEOGRAPHY SEARCH	MCGRAW-HILL	AP,TR			X		SI
GEOLOGY SEARCH	MCGRAW-HILL	AP,TR			X	X	SI
STATES & CAPITALS	ATARI	AT		X			DP
SUPERMAP	APPLE	AP		X			SI,DP

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LANGUAGE ARTS - READING

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ADVENTURE 5, 6, 7, 8	ADV INT'L	AP,TI,TR			X	X	SI,PS
ADVENTURE 9, 10, 11, 12	ADV INT'L	AP,TI,TR			X	X	SI,PS
ALPHABETIZATION	MILLIKEN	AP	X				DP
CATERPILLAR (ELEMENTARY VOL. 7)	MECC	AP,PE,IBM,TR	X				DP
CATERPILLAR (PRE-READING)	MECC	AT,PE,IBM,TR	X				DP
COMPREHENSION POWER	MILLIKEN	AP		X			DP
CROSS CLUES	SRA	AP		X	X	X	EG
CROSSWORD MAGIC	L&S COMP	AP,AT		X	X	X	DP,MG,EG
EARLY LEARNING FUN	TEXAS INST	TI	X				DP
EARLY READING	SCOTT FORS	TI	X				DP
GAME SHOW	COM-ADV ID	AP	X	X	X	X	EG,DP,UT
HODGE PODGE	DYNACOMP	AP	X				EG
JUGGLES' RAINBOW	TLC	AP	X				EG,PS
LANGUAGE ARTS SEQUENCES	MILLIKEN	AP	X	X	X	X	DP
LETTERS & NUMBERS	TCH TOOLS	PE	X				DP
MAGIC SPELLS	APPLE	AP		X	X		DP,EG
MIXUP (ELEMENTARY VOL. 2)	MECC	AP,PE,IBM	X	X			DP,EG,UT
MOPTOWN	APPLE	AP	X	X	X		EG,PS
MOPTOWN HOTEL	FOLLETT	TRC		X	X		EG,PS
MOPTOWN PARADE	FOLLETT	TRC	X	X			EG,PS
MYSTERY HOUSE	ON-LINE	AP			X	X	PS,EG
N-LV-ADJ PATTERN	MIC IN ED	PE		X	X		DP
NEWBERY AWARD WINNERS	SUNBURST	AP,PE,TR		X	X		DP
PREFIXES (ELEMENTARY VOL. 5)	MECC	AP		X	X		TU,DP
READABILITY ANALYSIS (SCH UTIL V2)	MECC	AP	X	X	X	X	CN
READING LEVEL	SCH COUR J	AP,PE,TR	X	X	X	X	CN
SCRAMBLED LETTERS	ED'L ACTV	AP,AT,PE,TR	X	X			DP,UT
SHELL GAMES	APPLE	AP	X	X	X	X	DP,EG,UT,TU
SNOOPER TROOPS	SPINNAKER	AP		X	X	X	EG,PS
SPEED READER	APPLE	AP		X	X	X	DP
WHAT'S DIFFERENT?	PRO DESIGN	AP,AT,PE,TR	X				DP
WORD FAMILIES	HARTLEY	AP	X	X			DP
WORDGAME (ELEMENTARY VOL. 2)	MECC	AP	X	X	X	X	EG,UT

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LANGUAGE ARTS - LIBRARY SKILLS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
BOOKSHELF	MIC IN ED	PE	X	X			DP,TU
DICTIONARY GUIDE WORDS	MICRO-ED	PE		X	X		DP

LANGUAGE ARTS - SPELLING

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
CROSS CLUES	SRA	AP		X	X	X	EG
CROSSWORD MAGIC	L&S COMP	AP,AT		X	X	X	DP,MG,EG
CUSTOMIZED FLASH SPELL	RANDOM	AP,TR	X	X	X	X	CM,DP
FLASH SPELLING	ED'L ACTV	AP,PE,TR	X	X			DP
MAGIC SPELLS	APPLE	AP		X	X		DP,EG
MIXUP (ELEMENTARY VOL. 2)	MECC	AP,PE,IBM	X	X			DP,EG,UT
SCRAMBLED LETTERS	ED'L ACTV	AP,AT,PE,TR	X	X			DP,UT
SPELL (ELEMENTARY VOL. 2)	MECC	AP		X	X		DP,UT
SPELL-N-TIME	SCH COUR J	AP,PE,TR		X			DP
SPELLING	ED'L ACTV	AP,AT,PE,TR	X	X			DP
SPELLING MACHINE	SW ED PSY	AP		X	X		DP,EG
SPELLING PACKAGE	TCH TOOLS	PE		X	X		DP
TICTACTOE SPELL	JMH	PE		X	X		DP,EG

LANGUAGE ARTS - WRITING

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
APPLEWRITER	APPLE	AP		X	X	X	WP
BANK STREET WRITER	SCHOLASTIC	AP,AT	X	X	X		WP
CAPITALIZATION	HARTLEY	AP		X			TU,DP
COMPUPOEM	SCWRIP	AP		X	X	X	TU,DP
DRAGON GAME SERIES	ED'L ACTV	AP,AT,PE,TR		X			EG
MAGIC SPELLS	APPLE	AP		X	X		DP,EG

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
MAGIC WINDOW	ARTSCI	AP			X	X	WP
PAPERMATE	AB COMP	PE			X	X	WP
PREFIXES (ELEMENTARY VOL. 5)	MECC	AP		X	X		TU,DP
PUNCTUATION	ED'L ACTV	AP	X	X			TU,DP
PUNCTUATION SKILLS: COMMAS	MILT BRAD	AP		X	X		TU,DP
PUNCTUATION SKILLS: END MARKS	MILT BRAD	AP		X	X		TU,DP
SCRIPSIT	RADIO SHAK	TR			X	X	WP
SHELL GAMES	APPLE	AP	X	X	X	X	DP,EG,UT,TU
SUPERTEXT	MUSE	AP			X	X	WP
VOWELS	HARTLEY	AP	X	X			DP
WORD PRO 4 PLUS	COMMODORE	PE				X	WP
WORDSTAR	MICROPRO	AP(CP/M)				X	WP

MATH - ARITHMETIC PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ADD FACTS 0-5, 0-10, & 0-20	MIC IN ED	PE	X				DP
ADDITION & SUBTRACTION 1 & 2	SCOTT FORS	TI	X				DP,TU
ADDITION CONCEPT	MIC IN ED	PE	X				DP,TU
ADDITION TABLE	MIC IN ED	PE	X				DP
ADDITION-ALL LEVELS	TCH TOOLS	PE	X	X			DP
ALIEN ADDITION	DLM	AP	X	X			DP,EG
ALLIGATOR MIX	DLM	AP,PE,TR	X	X			DP,EG
APPLE-BASED EL MATH CLS:FRA/DC	STER SWIFT	AP		X	X		DP,TU,CM
APPLE-BASED EL MATH CLS:WHOLE!	STER SWIFT	AP	X	X			DP,TU,CM
ARITH-MAGIC	QED	AP,PE,TR	X	X	X		DP,EG
ARITHMETIC CLASSRM:ADDITION	STER SWIFT	AP	X				DP,TU
ARITHMETIC CLASSRM:DIVISION	STER SWIFT	AP		X			DP,TU
ARITHMETIC CLASSRM:MULTIPLICAT	STER SWIFT	AP		X			DP,TU
ARITHMETIC CLASSRM:WHOLE!	STER SWIFT	AP	X	X			DP,TU
ARITHMETIC OF FUNCTIONS	MATH SOFT	AP				X	DE
BAGELS (MATH VOL. 1 & ELEM VOL. 1)	MECC	AP,PE,IBM,TR		X	X	X	EG
BAGELS (METRIC & PROB SOLVING)	MECC	AT		X	X	X	EG

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
BASE 10 (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR		X	X		DP,EG
BASE 10 (ELEMENTARY VOL. 1)	MECC	AP		X	X		DP,EG
BUMBLE PLOT	TLC	AP	X	X			EG,PS
CHANGE (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR		X			DP
CHANGE (ELEMENTARY VOL. 1)	MECC	AP		X			DP
COLUMN ADD	MIC IN ED	PE		X			DP,TU
COMPARE FRACTIONS	MIC IN ED	PE		X			DP,TU
COMPUTER MATH GAME	ADD-WESLEY	AP	X	X			DP,EG
COUNTING 1	MIC IN ED	PE	X				DP,TU
DARTS	CRE CMP	PE	X	X	X	X	DP
DECIMAL ESTIMATION	SCH COUR J	AP,PE,TR			X		DP
DEMOLITION DIVISION	DLM	AP		X			DP,EG
DIVISION SKILLS	MILT BRAD	AP		X			DP
DRAGON MIX	DLM	AP		X			DP,EG
DRAGSTRIP MATH	MIC IN ED	PE	X	X			DP,EG
DUELING DIGITS	BRODERBUND	AP	X	X			DP,EG
ESSENTIAL MATH PROGRAM	RADIO SHAK	TR			X	X	DP,TU
ESTIMATE (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR		X			DP
ESTIMATE (ELEMENTARY VOL. 4)	MECC	AP,PE,IBM,TR		X			DP
FACT TRACK	SRA	AT	X	X			DP
FACTORING WHOLE NUMBERS	QED	AP,TR		X	X		DP
FACTORY	SUNBURST	AT		X	X	X	PS,EG
FAST ADD	MIC IN ED	PE	X				DP
FRACTION-EQUIV 1	MIC IN ED	PE		X			DP,TU
FRACTIONS	QED	AP,TR		X	X		DP
FRACTIONS 1 & 2	MIC IN ED	PE	X	X			DP,TU
FRACTIONS EQUIVALENT 1	JMH	AT		X			DP,TU
FRACTIONS -ADD,SUB,MULT,DIV	ED'L ACTV	AP		X	X		DP
FRACTIONS:A REVIEW	BLS	AP		X	X		DP
FUNDAMENTAL MATHEMATICS I	RANDOM	TR	X	X			DP
FUNDAMENTAL MATHEMATICS II	RANDOM	TR		X			DP
FUNDAMENTAL MATHEMATICS III	RANDOM	TR		X			DP
GERTRUDE'S PUZZLES	TLC	AP		X			EG,PS
GERTRUDE'S SECRETS	TLC	AP	X	X			DP,EG,PS

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
GOLF	MIC IN ED	PE		X			DP
GRID SEARCH	CREAT PUBS	AP,PE,TR		X	X		PS,DP
GUESS THE RULE	EDU-SOFT	AP			X	X	EG
HURKLE (ELEMENTARY VOL. 1)	MECC	AP		X			EG,PS
HURKLE (METRIC & PROB SOLVING)	MECC	AT,PE,IBM,TR		X			EG,PS
ICBM (GRAPHING)	MECC	AT				X	SI
ICBM (MATH VOL. 1 & SCIENCE VOL. 2)	MECC	AP				X	SI
IMPROP FRACT 1, 2, & 3	MIC IN ED	PE		X	X		DP,TU
JUGGLES' RAINBOW	TLC	AP	X				EG,PS
K-8 MATH PROGRAM	RADIO SHAK	TR	X	X	X		DP,TU
K-8 MATH WORKSHEET GENERATOR	RADIO SHAK	TR	X	X	X		MG
LETTERS & NUMBERS	TCH TOOLS	PE	X				DP
MATH IDEAS WITH BASE TEN BLOCKS	CUISENAIRE	AP	X	X			TU
MATH MACHINE	SW ED PSY	AP	X	X			DP,CM
MATH SKILL GAMES	MCGRAW-HILL	PE	X	X			DP,EG
MATH SWIM	MIC IN ED	PE	X	X			DP
MATHWARE	MATH CITY	AP	X	X	X		DP,TU
METEOR MULTIPLICATION	DLM	AP		X			DP,EG
MILLIKEN MATH SEQUENCES	MILLIKEN	AP,AT,PE,TR	X	X			DP,CM
MINDSTRETCHER SERIES	ISL SOFTWR	PE		X	X	X	EG
MINUS MISSION	DLM	AP	X				DP,EG
MIXED FRACT 1, 2, & 3	MIC IN ED	PE		X	X		DP,TU
MOPTOWN	APPLE	AP	X	X	X		EG,PS
MOPTOWN HOTEL	FOLLETT	TRC		X	X		EG,PS
MOPTOWN PARADE	FOLLETT	TRC	X	X			EG,PS
MU MATH	MICROSOFT	AP				X	DP,TU
MULT FACTS 0-25 & 0-100	MIC IN ED	PE	X	X			DP
MULTIPLICATION I	SCOTT FORS	TI	X	X			DP,TU
NUMBER MAGIC	TEXAS INST	TI	X				DP
NUMBER SEQ 1 & 2	MIC IN ED	PE	X				DP,TU
NUMBER SERIES	PRO DESIGN	AP,AT,PE,TR				X	DP
PLACE VALUE I	MIC IN ED	PE	X				DP
PRESCRIPTIVE MATH DRILL	HARTLEY	AP	X	X			DP
READ & SOLVE MATH PROBLEMS	ED'L ACTV	AP,PE,TR		X			DP

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
REDUCE FRACTION	MIC IN ED	PE		X	X		DP,TU
ROCKY'S BOOTS	TLC	AP		X	X	X	EG,PS
ROUND (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR	X	X			DP
ROUND (ELEMENTARY VOL. 1)	MECC	AP	X	X			DP
ROUNDING	MIC IN ED	PE		X			DP,TU
RULER FRACTIONS	MIC IN ED	PE		X			DP,TU
SHELL GAMES	APPLE	AP	X	X	X	X	DP,EG,UT,TU
SOCCER MATH	COMPUTATNS	AP	X	X			DP,EG
SPEED DRILL (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR	X	X			DP
SPEED DRILL (ELEMENTARY VOL. 1)	MECC	AP	X	X			DP
SRA CLASSROOM MGMT SYSTEM	SRA	AP,AT	X	X			DP
SRA DR & INSTR MATHEMATICS B	SRA	AP,AT	X	X			DP,TU
SUBT CONCEPTS	MIC IN ED	PE	X				TU
SUBT FACTS 0-10 & 0-20	MIC IN ED	PE	X				DP
SUBTRACTION-ALL LEVELS	TCH TOOLS	PE	X	X			DP
SURVIVAL MATH	SUNBURST	AP,AT,TR			X	X	SI,PS
TAXMAN (ELEMENTARY VOL. 1)	MECC	AP			X		EG
TAXMAN (METRIC & PROBLEM SOLVING)	MECC	AT,PE,IBM,TR			X		EG
TIC TAC FACTS	MIC IN ED	PE	X	X			DP
ZAP ADD 2-6 & 5-9	MIC IN ED	PE	X				EG
ZAP MULT 2-6 & 5-9	MIC IN ED	PE		X			EG

MATH - GEOMETRY, MEASUREMENT, & GRAPHS PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
AESTHEOMETRY	MECC	AP			X	X	PS,TU
APPROXIMATE MEASUREMENT 1	SCH COUR J	AP,PE,TR		X			DP
APPROXIMATE MEASUREMENT 2	SCH COUR J	AP,PE,TR		X			DP
CACTUSPLOT	CACTUS	AP				X	DE,TU
CALENDAR	JMH	AT	X	X			DP
CALENDAR	MIC IN ED	PE	X	X			DP
CLOCK	HARTLEY	AP	X				DP

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
CLOCK	MIC IN ED	PE	X				DP,TU
ELEMENTARY VOL. 8-GEOMETRY	MECC	AP	X	X			DP,TU
ELEMENTARY VOL. 9-GEOMETRY	MECC	AP		X			DP,TU
ELEMENTARY VOL. 10-GEOMETRY	MECC	AP		X			DP,TU
FUNCTION GRAPHER	MATH SOFT	AP			X		DP,TU
GEOMETRY AND MEASUREMENT	APPLE	AP			X	X	DP
GEOMETRY AND MEASUREMENT	CUISENAIRE	AP		X	X		TU
GRAPHING	ED'L ACTV	AP,PE,TR		X	X		DP
MATHEMATICS VOL. 2 (MEASUREMENT)	MECC	AP			X		TU,DP
MATHEMATICS VOL. 3 (GEOMETRY)	MECC	AP			X		TU
METRIC 21 (ELEMENTARY VOL. 1)	MECC	AP		X			DP,EG
METRIC 21 (METRIC & PROB SOLVING)	MECC	AT,PE,IBM,TR		X			DP,EG
METRIC ESTIMATE (ELEM VOL. 1)	MECC	AP		X			DP
METRIC ESTIMATE (METR & PROB SOLV)	MECC	AT,PE,IBM,TR		X			DP
PLOT	EDU-SOFT	AP			X	X	DE
SHAPES (ELEM VOL. 7)	MECC	AP,PE,IBM,TR	X				DP
SHAPES (PRE-READING)	MECC	AT	X				DP,EG
SLOPE (GRAPHING)	MECC	AT,PE,IBM,TR			X	X	PS
SLOPE (MATH VOL. 1)	MECC	AP			X	X	PS
SMALLEST UNIT OF MEASURE	SCH COUR J	AP,PE,TR	X	X			DP
SNARK (GRAPHING)	MECC	AT			X	X	EG
SNARK (MATH VOL. 1)	MECC	AP			X	X	EG

MATH - ADVANCED MATH PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ADVANCED GRAPHICS	RADIO SHAK	TR			X	X	DP,TU
AESTHEOMETRY	MECC	AP			X	X	PS,TU
COMPUTER GRAPHING EXPERIMENTS	ADD-WESL	AP				X	TU,PS
GEOMETRY AND MEASUREMENT	APPLE	AP			X	X	DP
GRAPHIC INTEGRATION THEORY	MATH SOFT	AP				X	PS
ICBM (GRAPHING)	MECC	AT				X	SI

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ICBM (MATH VOL. 1 & SCIENCE VOL. 2)	MECC	AP				X	SI
LIMITS OF SEQUENCES	MATH SOFT	AP				X	DP,TU
MATHEMATICS VOL. 4 (ADVANCED)	MECC	AP				X	PS
SINE&COSINE GRAPHER	MATH SOFT	AP				X	DP,PS
SOLV'G SIMULTANEOUS LIN SYST	MATH SOFT	AP			X	X	DP,TU

MATH - ALGEBRA PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ALGEBRA (MATH VOL. 1)	MECC	AP			X	X	DP,TU
ALGEBRA 1	EDU-WARE	AP			X	X	DP
ALGEBRA BILLIARDS	CURR APP	TR			X	X	EG
COMPUTER GRAPHING EXPERIMENTS	ADD-WESL	AP				X	TU,PS
LESSONS IN ALGEBRA	GEO EARL	AP			X	X	DP,TU
SLOPE (GRAPHING)	MECC	AT,PE,IBM,TR			X	X	PS
SLOPE (MATH VOL. 1)	MECC	AP			X	X	PS
SNARK (GRAPHING)	MECC	AT			X	X	EG
SNARK (MATH VOL. 1)	MECC	AP			X	X	EG

COMPUTER LITERACY PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ANTFARM	WINS	AP			X	X	CP
APPLE LOGO	APPLE	AP	X				CP
APPLE PASCAL	APPLE	AP				X	CP
APPLE PILOT	APPLE	AP		X	X	X	CP
ATARI PILOT	ATARI	AT		X	X	X	CP
BASIC INSTR COURSE	RADIO SHAK	TR			X		TU
COMPUTER DISCOVERY	SRA	AP,AT,TR		X	X	X	TU
DELTA DRAWING	SPINNAKER	AP,AT		X	X	X	CP

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
E-Z PILOT	TECK ASSOC	AP		X	X	X	CP
ELEMENTARY, MY DEAR APPLE	APPLE	AP		X	X		CP
HOW TO PROGRAM IN BASIC	STER SHIFT	AP			X	X	TU
KAREL THE ROBOT	CYBERTRON	AP				X	CP
KIDSTUFF	JL HAMMETT	PE	X	X			CP
MASTERTYPE	LIGHTNING	AP,AT		X	X	X	EG,DP
ROBOTWAR	MUSE	AP			X	X	CP
SIMULATED COMPUTER	EDU-SOFT	AP,AT,TR					CP
STEP BY STEP (NEW)	PRO DESIGN	AP			X	X	TU
TERRAPIN LOGO	TERRAPIN	AP	X				CP
TI LOGO	TEXAS INST	TI	X				CP

PROBLEM-SOLVING PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
BAGELS (MATH VOL. 1 & ELEM. VOL. 1)	MECC	AP,PE,IBM,TR		X	X	X	EG
BAGELS (METRIC & PROB SOLVING)	MECC	AT		X	X	X	EG
BIRTH OF THE PHOENIX	PHOENIX	AP,PE		X	X		EG
BUMBLE GAMES	TLC	AP	X	X			EG,PS
BUMBLE PLOT	TLC	AP	X	X			EG,PS
FACEMAKER	SPINNAKER	AP,AT	X	X			EG,PS
FACTORY	SUNBURST	AT		X	X	X	PS,EG
GERTRUDE'S PUZZLES	TLC	AP		X			EG,PS
GERTRUDE'S SECRETS	TLC	AP	X	X			DP,EG,PS
HURKLE (ELEM VOL. 1)	MECC	AP		X			EG,PS
HURKLE (METRIC & PROB SOLVING)	MECC	AT,PE,IBM,TR		X			EG,PS
JUGGLES' RAINBOW	TLC	AP	X				EG,PS
MOPTOWN	APPLE	AP	X	X	X		EG,PS
MOPTOWN HOTEL	FOLLETT	TRC		X	X		EG,PS
MOPTOWN PARADE	FOLLETT	TRC	X	X			EG,PS
ROCKY'S BOOTS	TLC	AP		X	X	X	EG,PS
SNOOPER TROOPS	SPINNAKER	AP		X	X	X	EG,PS

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PRIMARY EDUCATION PROGRAMS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
ALPHABET	MIC IN ED	PE	X				
CATERPILLAR (ELEMENTARY VOL. 7)	MECC	AP,PE,IBM,TR	X				DP
CATERPILLAR (PRE-READING)	MECC	AT,PE,IBM,TR	X				DP
COUNTING 1	MIC IN ED	PE	X				DP,TU
EARLY LEARNING FUN	TEXAS INST	TI	X				DP
EARLY READING	SCOTT FORS	TI	X				DP
JUGGLES' RAINBOW	TLC	AP	X				EG,PS
LETTERS & NUMBERS	TCH TOOLS	PE	X				DP
MOPTOWN	APPLE	AP	X	X	X		EG,PS
MOPTOWN PARADE	FOLLETT	TRC	X	X			EG,PS
NUMBER SEQUENCE	JMH	PE	X				
PICTURES (ELEMENTARY VOL. 7)	MECC	AP	X				DP,PS,EG
PICTURES (PRE-READING)	MECC	AT,PE,IBM,TR	X				DP,PS,EG
SHAPES (PRE-READING)	MECC	AT	X				DP,EG
TRAIN (ELEMENTARY VOL. 7)	MECC	AP,PE,IBM,TR	X				DP
TRAIN (PRE-READING)	MECC	AT	X				DP
WORDS (ELEMENTARY VOL. 7)	MECC	AP	X				EG,DP,PS
WORDS (PRE-READING)	MECC	AT,PE,IBM,TR	X				DP,PS,EG
WUZZLE (ELEMENTARY VOL. 7)	MECC	AP	X				DP
WUZZLE (PRE-READING)	MECC	AT,PE,IBM,TR	X				DP

TEACHING TOOLS

TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
AMAZING (ELEMENTARY VOL. 2)	MECC	AP,PE,IBM	X	X			MG
ARISTOTLE'S APPLE	STONEWARE	AP	X	X	X	X	DP,EG,UT
CROSSWORD MAGIC	L&S COMP	AP,AT		X	X	X	DP,MG,EG
GAME SHOW	COM-ADV ID	AP	X	X	X	X	EG,DP,UT
K-8 MATH WORKSHEET GENERATOR	RADIO SHAK	TR	X	X	X		MG
MATCH GAME	TCH TOOLS	AP,PE	X	X	X		EG,UT
MIXUP (ELEMENTARY VOL. 2)	MECC	AP,PE,IBM	X	X			DP,EG,UT
SCRAMBLED LETTERS	ED'L ACTV	AP,AT,PE,TR	X	X			DP,UT

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TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
SHELL GAMES	APPLE	AP	X	X	X	X	DP,EG,UT,TU
SPELL (ELEMENTARY VOL. 2)	MECC	AP		X	X		DP,UT
STATISTICS	EDU-WARE	AP				X	TU,UT
WORDGAME (ELEMENTARY VOL. 2)	MECC	AP	X	X	X	X	EG,UT

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CURRICULUM AREA

SUBJECT/TOPIC

AR Art
CL Computer Literacy
- -CP Computer Programming
- -PS Problem Solving

FL Foreign Language
LA Language Arts
- -LS Library Skills
- -RE Reading
- -SP Spelling
- -WR Writing

MA Mathematics
- -AD Advanced Mathematics
- -AL Algebra
- -AR Arithmetic
- -GM Geometry/Measurement

MU Music
PR Primary
PS Problem Sovling/Logic
SC Science
BI Biology
- -BO Botany
- -CH Chemistry
- -EE Environmental Education/Ecology
- -ES Earth Science
- -PH Physics
- -HL Health

SS Social Studies
- -EC Economics
- -EE Environmental Education/Ecology
- -GE Geography
- -GO Government
- -HI History

SN Special Needs
TT Teaching Tools
WP Word Processing

MODES OF INSTRUCTION

AU Authoring
CM Classroom Management
CP Computer Programming
DE Demonstration
DP Drill & Practice
EG Educational Game
MG Materials Generation
PS Problem Solving
SI Simulation
TU Tutorial
UT Utility for Teachers
WP Word Processing

COMPUTERS

AP Apple
AT Atari
IBM International Business Machines
PE Commodore/Pet
TI Texas Instruments
TR Radio Shack
TRC Radio Shack Color Computer

PUBLISHERS ON PREVIEW LIST

AB Computers (AB COMP)
252 Bethlehem Pike
Colmar, PA 18915

Addison-Wesley Publishing Co. (ADD-WESLEY)
2725 Sand Hill Road
Menlo Park, CA 94025

Adventure International (ADV-INT'L)
P. O. Box 3435
Longwood, FL 32750

Apple Computer Company (APPLE)
10260 Bandley Drive
Cupertino, CA 94017

Artsci, Inc. (ARTSCI)
5547 Satsuma Avenue
North Hollywood, CA 91601

Atari, Inc. (ATARI
1272 Borregas Avenue
Sunnyvale, CA 94086

BLS, Inc. (BLS)
2503 Fairlee Road
Wilmington, DE 19810

Broderbund Software (BRODERBUND)
1938 Fourth Street
San Rafael, CA 94901

Cactus Software (CACTUS)
1442 N. McAllister
Tempe, AZ 85281

Computer-Advanced Ideas, Inc. (COM-ADV ID)
Suite 341, 1442A Walnut Street
Berkeley, CA 94709

Commodore Business Machines (COMMODORE)
3330 Scott Blvd.
Santa Clara, CA 95051

Compu-Tations, Inc. (COMPUTATNS)
P. O. Box 502
Troy, MI 48099

Conduit (CONDUIT)
P. O. Box 388
Iowa City, IA 52244

Creative Publications (CREAT PUBS)
P. O. Box 10328
Palo Alto, CA 94303

Creative Computing (CRE CMP)
39 East Hanover Avenue
Plains, NJ 07950

Cuisenaire Co. of America, Inc. (CUISENAIRE)
12 Church St., Box D
New Rochelle, NY 10805

Curriculum Applications (CURR APP)
P. O. Box 264
Arlington, MA 02174

Cybertronics, Inc. (CYBERTRON)
903 Park Avenue
New York, NY 10021

Developmental Learning Materials (DLM)
One DLM Park, P. O. Box 4000
Allen, TX 75002

Dynacomp, Inc. (DYNACOMP)
1427 Monroe Avenue
Rochester, NY 14618

Educational Activities, Inc. (ED'L ACTV)
P. O. Box 392
Freeport, NY 11520

Edu-Soft -- Steketee Ed. Software (EDU-SOFT)
4639 Spruce Street
Philadelphia, PA 19139

Edu-Ware Services (EDU-WARE)
22035 Burbank Boulevard #223
Woodland Hills, CA 91367

Edutech (EDUTECH)
50 Putnam Street
W. Newton, MN 02165

George Earl (GEO EARL)
1302 S. Gen. McMullen
San Antonio, TX 78237

Earthware Computer Services (EARTHWARE)
P. O. Box 30039
Eugene, OR 97403

Hartley Courseware, Inc. (HARTLEY)
P. O. Box 431
Demondale, MI 48821

High Technology Software Products (HIGH TECH)
P. O. Box 14665, 8001 N. Classen Blvd.
Oklahoma City, OK 73113

Island Software (ISL SOFTWR)
Box 300
Lake Grove, NY 11755

J. L. Hammett Co., Inc. (JL HAMMETT)
Hammett Place, P. O. Box 545
Braintree, MA 02184

JMH Software of Minnesota (JMH)
4850 Wellington Lane
Minneapolis, MN 55442

L&S Computerware (L&S COMP)
1589 Fraser Drive
Sunnyvale, CA 94087

The Learning Company (TLC)
4370 Alpine Road
Portola Valley, CA 94025

Lightning Software (LIGHTNING)
P. O. Box 11725
Palo Alto, CA 94306

Mathware/Math City (MATH CITY)
4040 Palos Verde Dr., N., Suite 202
Rolling Hills Estates, CA 90274

Math Software (MATH SOFT)
1233 Blackthorn Pl.
Deerfield, IL 60015

Minnesota Educational Computing Consortium
2520 Broadway Drive (MECC)
St. Paul, MN 55113

McGraw-Hill (MCGRAW-HILL)
1221 Avenue of the Americas
New York, NY 10020

Microcomputers in Education (MIC IN ED)
4148 Winnetka Ave., North
Minneapolis, MN 55427

Micro-Ed., Inc. (MICRO-ED)
P. O. Box 24156
Minneapolis, MN 55424

Micro Music, Inc. (MICRO MUS)
309 West Beaufort
Normal, IL 61761

Micro Pro International (MICROPRO)
99 Fourth Street
San Rafael, CA 94901

Microsoft Consumer Products (MICROSOFT)
10700 Northrup Way
Bellevue, WA 98004

Milliken Publishing (MILLIKEN)
1100 Research Blvd.
St. Louis, MO 63132

Milton Bradley Co. (MILT BRAD)
Shaker Road
E. Longmeadow, MA 01028

MUSE Software (MUSE)
330 N. Charles St.
Baltimore, MD 21201

On-Line Systems (ON-LINE)
36575 Mudge Ranch Road
Coarsegold, CA 93614

Phoenix Software (PHOENIX)
64 Lake Zurich Drive
Lake Zurich, IL 60047

Program Design, Inc. (PRO DESIGN)
71 Idar Court
Greenwich, CT 06830

Quality Educational Design (QED)
P. O. Box 12486
Portland, OR 97212

Radio Shack Ed. Division (RADIO SHAK)
400 Tandy Atrium
Fort Worth, TX 76102

Random House School Division (RANDOM)
400 Hahn Road
Westminister, MD 21157

School Courseware Journal (SCH COUR J)
4919 N. Milbrook #222
Fresno, CA 93725

Scott Foresman & Co. (SCOTT FORS)
1900 East Lake Ave.
Glenview, IL 60025

South Coast Writing Project (SCWRIP)
University of California
Santa Barbara, CA 93106

Spinnaker Software Corp. (SPINNAKER)
215 First Street
Cambridge, MA 02142

Science Research Associates, Inc. (SRA)
155 North Wacker Dr.
Chicago, IL 60606

Sterling Swift Publishing Co. (STER SWIFT)
1600 Fortview Road
Austin, TX 78704

Stoneware Microcomputer Products (STONEWARE)
1930 Fourth Street
San Rafael, CA 94901

Strategic Simulations (STRAT SIM)
465 Fairchild Drive, Suite 108
Mountain View, CA 94043

Sunburst Communications (SUNBURST)
39 Washington Avenue
Pleasantville, NY 14850

SouthWest EdPsych Services (SW ED PSY)
Box 1870
Phoenix, AZ 85001

Teaching Tools: Microcomputer Services (TCH TOOLS)
P. O. Box 50065
Palo Alto, CA 94303

Teck Associates (TECK ASSOC)
P. O. Box 8732
White Bear lake, MN 55110

Terrapin, Inc. (TERRAPIN)
678 Massachusetts Ave. #205
Boston, MA 02139

Texas Instruments (TEXAS INST)
P. O. Box 53
Lubbock, TX 79408

Versa Computing Company (VERSA)
887 Conestoga Circle
Newbury Park, CA 91320

Wheaton Information Management Systems (WIMS)
6723 East 66th Place
Tulsa, OK 74133

ADDENDUM:

Scholastic, Inc. (SCHOLASTIC)
904 Sylvan Avenue
Englewood Cliffs, NJ 07632

PREVIEW GUIDE TITLES & PRICES

TITLE	PUBL	COMPUTER	CURR AREA	SUBJ/TOPIC	PRICE
ADD FACTS 0-5, 0-10, & 0-20	MIC IN ED	PE	MA	AR	7.50 EACH
ADDITION & SUBTRACTION 1 & 2	SCOTT FORS	TI	MA	AR	44.95 EACH
ADDITION CONCEPT	MIC IN ED	PE	MA	AR	7.50
ADDITION TABLE	MIC IN ED	PE	MA	AR	7.50
ADDITION-ALL LEVELS	TCH TOOLS	PE	MA	AR	20.00
ADVANCED GRAPHICS	RADIO SHAK	TR	MA	AD	39.95
ADVENTURE 5, 6, 7, 8	ADV INT'L	AP,TI,TR	LA	RE	24.95
ADVENTURE 9, 10, 11, 12	ADV INT'L	AP,TI,TR	LA	RE	24.95
AESTHEOMETRY	MECC	AP	MA,AR	GM,AD	39.30
ALGEBRA (MATH VOL. 1)	MECC	AP	MA	AL	30.00 D
ALGEBRA 1	EDU-WARE	AP	MA	AL	39.95
ALGEBRA BILLIARDS	CURR APP	TR	MA	AL	16.95
ALIEN ADDITION	DLM	AP	MA	AR	39.00
ALLIGATOR MIX	DLM	AP,PE,TR	MA	AR	39.00
ALPHABET	MIC IN ED	PE	PR		7.50
ALPHABETIZATION	MILLIKEN	AP	LA	RE	75.00
AMAZING (ELEMENTARY VOL. 2)	MECC	AP	LA,TT		40.00 D
ANTFARM	WIMS	AP	CL	CP	49.95
APPLE LOGO	APPLE	AP	CL	CP	160.00
APPLE PASCAL	APPLE	AP	CL	CP	250.00
APPLE PILOT	APPLE	AP	CL	CP	150.00
APPLE-BASED EL MATH CLS:FRA/DC	STER SWIFT	AP	MA	AR	495.00 (SET)
APPLE-BASED EL MATH CLS:WHOLE	STER SWIFT	AP	MA	AR	495.00
APPLEWRITER	APPLE	AP	LA	WR	75.00
APPROXIMATE MEASUREMENT 1	SCH COUR J	AP,PE,TR	MA	GM	12.95
APPROXIMATE MEASUREMENT 2	SCH COUR J	AP,PE,TR	SC,MA	PH,GM	12.95
ARISTOTLE'S APPLE	STONEWARE	AP	TT		34.95
ARITH-MAGIC	QED	AP,PE,TR	MA	AR	35.00
ARITHMETIC CLASSRM:ADDITION	STER SWIFT	AP	MA	AR	49.95
ARITHMETIC CLASSRM:DIVISION	STER SWIFT	AP	MA	AR	49.95
ARITHMETIC CLASSRM:MULTIPLICAT	STER SWIFT	AP	MA	AR	49.95
ARITHMETIC CLASSRM:WHOLE !	STER SWIFT	AP	MA	AR	49.95
ARITHMETIC OF FUNCTIONS	MATH SOFT	AP	MA	AR	175.00
ARNOLD	MICRO MUS	AP	MU		190.00
ART - PERSPECTIVE DRAWING	MECC	AP	AR		35.50
ATARI PILOT	ATARI	AT	CL	CP	16.95
BAGELS (MATH VOL. 1 & ELEM. VOL. 1)	MECC	AP,PE,IBM,TR	MA,PS	AR	40.80 D/38.80 D
BAGELS (METRIC & PROB SOLVING)	MECC	AT	MA,PS	AR	36.80 D

TITLE	PUBL	COMPUTER	CURR AREA	SUBJ/TOPIC	PRICE
BANK STREET WRITER	SCHOLASTIC	AP,AT	LA	WR	95.00
BASE 10 (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR	MA	AR	37.10 D
BASE 10 (ELEMENTARY VOL. 1)	MECC	AP	MA	AR	38.80 D
BASIC INSTR COURSE	RADIO SHAK	TR	CL	CP	30.00
BIRDBREED	EDUTECH	AP	SC	BI	24.95
BIRTH OF THE PHOENIX	PHOENIX	AP,PE	PS	PS	22.00
BOOKSHELF	MIC IN ED	PE	LA	LS	7.50
BUFFALO (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,AP,PE	SS	HI	24.95 D
BUMBLE GAMES	TLC	AP	MA,PS	PS	60.00
BUMBLE PLOT	TLC	AP	MA,PS	AR,PS	60.00
CACTUSPLOT	CACTUS	AP	MA	GM	59.95
CALENDAR	JMH	AT	MA	GM	9.95
CALENDAR	MIC IN ED	PE	MA	GM	7.50
CAPITALIZATION	HARTLEY	AP	LA	WR	49.95
CARTELS & CUTTHROATS	STRAT SIMS	AP	SS	EC,DE	15.00
CATERPILLAR (ELEMENTARY VOL. 7)	MECC	AP,PE,IBM,TR	LA,PR	RE	38.50 D
CATERPILLAR (PRE-READING)	MECC	AT,PE,IBM,TR	LA,PR	RE	38.50 D
CHANGE (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR	MA	AR	37.10 D
CHANGE (ELEMENTARY VOL. 1)	MECC	AP	MA	AR	38.80 D
CHEM LAB SIMULATION #1	HIGH TECH	AP	SC	CH	100.00
CLOCK	HARTLEY	AP	MA	GM	39.95
CLOCK	MIC IN ED	PE	MA	GM	7.50
COLLIDE (SCIENCE VOL. 2)	MECC	AP	SC	PH	40.90 D
COLUMN ADD	MIC IN ED	PE	MA	AR	7.50
COMPARE FRACTIONS	MIC IN ED	PE	MA	AR	7.50
COMPREHENSION POWER	MILLIKEN	AP	LA	RE	150.00 /GR LEVEL
COMPUPOEM	SCWRIP	AP	LA	WR	15.95
COMPUTER DISCOVERY	SRA	AP,AT,TR	CL	CP	200.00
COMPUTER GRAPHING EXPERIMENTS	ADD-WESLEY	AP	MA	AL,AD	120.00
COMPUTER MATH GAME	ADD-WESLEY	AP	MA	AR	54.00
COUNTING 1	MIC IN ED	PE	PR,MA	AR	7.50
CROSS CLUES	SRA	AP	LA	RE,SP	29.95
CROSSWORD MAGIC	L&S COMP	AP,AT	LA,TT	SP,RE	29.95
CUSTOMIZED FLASH SPELL	RANDOM	AP,TR	LA	SP	24.50
DARTS	CRE CMP	PE	MA	AR	24.95
DECIMAL ESTIMATION	SCH COUR J	AP,PE,TR	MA	AR	15.95
DELTA DRAWING	SPINNAKER	AP,AT	CL	CP	59.95
DEMOLITION DIVISION	DLM	AP	MA	AR	39.00
DICTIONARY GUIDE WORDS	MICRO-ED	PE	LA	LS	7.95

Preview Guide Titles & Prices (con't.)

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DIVISION SKILLS	MILT BRAD	AP	MA	AR	49.95
DOREMI	MICRO MUS	AP	MU		100.00
DRAGON GAME SERIES	ED'L ACTV	AP,AT,PE,TR	LA	WR	49.00
DRAGON MIX	DLM	AP	MA	AR	39.00
DRAGSTRIP MATH	MIC IN ED	PE	MA	AR	7.50
DUELING DIGITS	BRODERBUND	AP	MA	AR	29.95
E-Z PILOT	TECK ASSOC	AP	CL	CP	39.95
EARLY LEARNING FUN	TEXAS INST	TI	LA,PR	RE	29.95
EARLY READING	SCOTT FORS	TI	LA,PR	RE	54.95
ECOLOGY SIMULATIONS 2	CRE CMP	AP,TR,PE	SS,SC	EE	24.95
ELEMENTARY VOL. 8-GEOMETRY	MECC	AP	MA	GM	33.90
ELEMENTARY VOL. 9-GEOMETRY	MECC	AP	MA	GM	35.10
ELEMENTARY VOL. 10-GEOMETRY	MECC	AP	MA	GM	34.50
ELEMENTARY, MY DEAR APPLE	APPLE	AP	CL	CP	29.95
ESSENTIAL MATH PROGRAM	RADIO SHAK	TR	MA	AR	398.00
ESTIMATE (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR	MA	AR	39.70 D
ESTIMATE (ELEMENTARY VOL. 4)	MECC	AP,PE,IBM,TR	MA	AR	39.70 D
FACEMAKER	SPINNAKER	AP,AT	PS	PS	
FACT TRACK	SRA	AT	MA	AR	100.00
FACTORING WHOLE NUMBERS	QED	AP,TR	MA	AR	90.00
FACTORY	SUNBURST	AT	MA,PS	AR,PS	35.00
FAST ADD	MIC IN ED	PE	MA	AR	7.50
FLASH SPELLING	ED'L ACTV	AP,PE,TR	LA	SP	14.95
FRACTION-EQUIV 1	MIC IN ED	PE	MA	AR	7.50
FRACTIONS	QED	AP,TR	MA	AR	VARIES W/PKG
FRACTIONS 1 & 2	MIC IN ED	PE	MA	AR	7.50 EACH
FRACTIONS EQUIVALENT 1	JMH	AT	MA	AR	9.95
FRACTIONS-ADD.SUB.MULT.DIV	ED'L ACTV	AP	MA	AR	39.95
FRACTIONS:A REVIEW	BLS	AP	MA	AR	
FUNCTION GRAPHER	MATH SOFT	AP	MA	GM	175.00 D
FUNDAMENTAL MATHEMATICS I	RANDOM	TR	MA	AR	195.00
FUNDAMENTAL MATHEMATICS II	RANDOM	TR	MA	AR	296.00
FUNDAMENTAL MATHEMATICS III	RANDOM	TR	MA	AR	225.00
GAME SHOW	CON-ADV ID	AP	LA,TT	RE	39.00
GEOGRAPHY SEARCH	MCGRAW-HIL	AP,TR	SS	GE	180.00
GEOLOGY SEARCH	MCGRAW-HIL	AP,TR	SS,SC	GE,ES	180.00
GEOMETRY AND MEASUREMENT	APPLE	AP	MA	AD,GM	50.00
GEOMETRY AND MEASUREMENT	CUISENAIRE	AP	MA	GM	49.95
GERTRUDE'S PUZZLES	TLC	AP	PS,MA	PS,AR	75.00

TITLE	PUBL	COMPUTER	CURR AREA	SUBJ/TOPIC	PRICE
GERTRUDE'S SECRETS	TLC	AP	MA,PS	AR,PS	75.00
GOLF	MIC IN ED	PE	MA	AR	7.50
GRAPHIC INTEGRATION THEORY	MATH SOFT	AP	MA	AD	VARIES W/PKG
GRAPHING	ED'L ACTV	AP,PE,TR	MA	GM	39.95
GRID SEARCH	CREAT PUBS	AP,PE,TR	MA	AR	23.95
GUESS THE RULE	EDU-SOFT	AP	MA	AR	14.95
HABER	CONDUIT	AP,TR	SC	CH	35.00
HODGE PODGE	DYNACOMP	AP	LA	RE	18.95
HOW TO PROGRAM IN BASIC	STER SWIFT	AP	CL	CP	74.95
HURKLE (ELEMENTARY VOL. 1)	MECC	AP	MA,PS	PS,AR	38.80 D
HURKLE (METRIC & PROB SOLVING)	MECC	AT,PE,IBM,TR	MA,PS	PS,AR	36.80 D
ICBM (GRAPHING)	MECC	AT	MA	AR,AD	40.90 D
ICBM (MATH VOL. 1 & SCIENCE VOL. 2)	MECC	AP	MA	AR,AD	40.90 D
IMPROP FRACT 1, 2, & 3	MIC IN ED	PE	MA	AR	7.50 EACH
INTERVAL MANIA	MICRO MUS	AP	MU		190.00
JUGGLES' RAINBOW	TLC	AP	LA,PR,MA,PS	RE,PS,AR	45.00
K-8 MATH PROGRAM	RADIO SHAK	TR	MA	AR	199.00
K-8 MATH WORKSHEET GENERATOR	RADIO SHAK	TR	MA,TT	AR	99.95
KAREL THE ROBOT	CYBERTRON	AP	CL	CP	85.00
KIDSTUFF	JL HAMMETT	PE	CL	CP	59.95
LANGUAGE ARTS SEQUENCES	MILLIKEN	AP	LA	RE	75.00
LESSONS IN ALGEBRA	GEO EARL	AP	MA	AL	29.95
LETTERS & NUMBERS	TCH TOOLS	PE	LA,PR,MA	RE,AR	20.00
LIMITS OF SEQUENCES	MATH SOFT	AP	MA	AD	175.00 D
MAGIC SPELLS	APPLE	AP	LA	RE,WR,SP	45.00
MAGIC WINDOW	ARTSCI	AP	LA	WR	69.00
MARKETPLACE	MECC	AT,PE,IBM,TR	SS	EC	37.90
MASTERTYPE	LIGHTNING	AP,AT	CL,LA		39.95
MATCH GAME	TCH TOOLS	AP,PE	LA,AR,MA,TT		24.95
MATH IDEAS WITH BASE TEN BLOCKS	CUISENAIRE	AP	MA	AR	49.95
MATH MACHINE	SW ED PSY	AP	MA	AR	79.95
MATH SKILL GAMES	MCGRAW-HIL	PE	MA	AR	58.95
MATH SWIM	MIC IN ED	PE	MA	AR	7.50
MATHEMATICS VOL. 2 (MEASUREMENT)	MECC	AP	MA	GM	36.90
MATHEMATICS VOL. 3 (GEOMETRY)	MECC	AP	MA	GM	37.30
MATHEMATICS VOL. 4 (ADVANCED)	MECC	AP	MA	AD	51.20
MATHWARE	MATH CITY	AP	MA	AR	VARIES W/PKG
MEET THE PRESIDENTS	VERSA	AP	SS	HI	39.95
MELODIOUS DICTATOR	MICRO MUS	AP	MU		190.00

Preview Guide Titles & Prices (con't.)

TITLE	PUBL	COMPUTER	CURR AREA	SUBJ/TOPIC	PRICE
METEOR MULTIPLICATION	DLM	AP	MA	AR	39.00
METRIC 21 (ELEMENTARY VOL. 1)	MECC	AP	MA	GM	38.80 D
METRIC 21 (METRIC & PROB SOLVING)	MECC	AT,PE,IBM,TR	MA	GM	36.80 D
METRIC ESTIMATE (ELEMENTARY VOL. 1)	MECC	AP	MA	GM	38.80 D
METRIC ESTIMATE (METR & PROB SOLV)	MECC	AT,PE,IBM,TR	MA	GM	36.80 D
MILLIKEN MATH SEQUENCES	MILLIKEN	AP,AT,PE,TR	MA	AR	200.00
MINDSTRETCHER SERIES	ISL SOFTWR	PE	MA	AR	100.00
MINERALS (EARTH SCIENCE)	MECC	AT,PE,IBM	SC	ES	37.40 D
MINERALS (SCIENCE VOL. 3)	MECC	AP	SC	ES	35.90 D
MINUS MISSION	DLM	AP	MA	AR	39.00
MIXED FRACT 1, 2, & 3	MIC IN ED	PE	MA	AR	7.50 EACH
MIXUP (ELEMENTARY VOL. 2)	MECC	AP,PE,IBM	LA,TT	RE,SP	40.40 D
MOPTOWN	APPLE	AP	PR,LA,MA,PS	PS,RE,AR	50.00
MOPTOWN HOTEL	FOLLETT	TRC	LA,MA,PS	PS,RE,AR	35.00
MOPTOWN PARADE	FOLLETT	TRC	LA,MA,PR,PS	PS,RE,AR	45.00
MU MATH	MICROSOFT	AP	MA	AR	
MULT FACTS 0-25 & 0-100	MIC IN ED	PE	MA	AR	7.50 EACH
MULTIPLICATION 1	SCOTT FORS	TI	MA	AR	39.95
MUSIC COMPOSER	MICRO MUS	AP	MU		175.00
MUSIC THEORY	MECC	AP,PE,IBM,TR	MU		44.00
MYSTERY HOUSE	ON-LINE	AP	LA	RE	
N-LV-ADJ PATTERN	MIC IN ED	PE	LA	RE	7.50 EACH
NEWBERY AWARD WNNRS	SUNBURST	AP,PE,TR	LA	RE	239.00
NEWTON 2 (SCIENCE VOL. 1)	MECC	AP	SC	PH	35.90 D
NUMBER MAGIC	TEXAS INST	TI	MA	AR	19.95
NUMBER SEQ 1 & 2	MIC IN ED	PE	MA	AR	7.50 EACH
NUMBER SEQUENCE	JMH	PE	PR		9.95
NUMBER SERIES	PRO DESIGN	AP,AT,PE,TR	MA	AR	16.95
ODELL LAKE (ELEMENTARY BIOLOGY)	MECC	AT,PE,IBM,TR	SC	BI,EE	37.80 D
ODELL LAKE (SCIENCE VOL. 3)	MECC	AP	SC	BI,EE	35.90 D
OREGON (ELEMENTARY VOL. 6)	MECC	AP,PE,IBM,TR	SS	HI	41.60 D
PAPERMATE	AB COMP	PE	LA	WR	32.95
PHYSICS COMPULAB	EDUTECH	AP	SC	PH	295.00
PICTURES (ELEMENTARY VOL. 7)	MECC	AP	PR		38.50 D
PICTURES (PRE-READING)	MECC	AT,PE,IBM,TR	PR		38.50 D
PLACE VALUE 1	MIC IN ED	PE	MA	AR	7.50
PLOT	EDU-SOFT	AP	MA	GM	14.95
POP (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP	SC	BI	24.95 D
PRACTICANDO ESPANOL	CONDUIT	AP	FL		100.00

TITLE	PUBL	COMPUTER	CURR AREA	SUBJ/TOPIC	PRICE
PREFIXES (ELEMENTARY VOL. 5)	MECC	AP	LA	WR,RE	37.80 D
PRESCRIPTIVE MATH DRILL	HARTLEY	AP	MA	AR	79.95
PRESIDENT ELECT	STRAT SIM	AP	SS	GO	39.95
PUNCTUATION	ED'L ACTV	AP	LA	WR	49.00
PUNCTUATION SKILLS:COMMAS	MILT BRAD	AP	LA	WR	49.95
PUNCTIATION SKILLS:END MARKS	MILT BRAD	AP	LA	WR	49.95
QUAKES (EARCH SCIENCE)	MECC	AT,PE,IBM,TR	SC	ES	37.40 D
QUAKES (SCIENCE VOL. 3)	MECC	AP	SC	ES	35.90 D
RATS (ECOLOGY SIMULATIONS 2)	CRE CMP	AP,PE,TR	SC	BI	24.95 D
READ & SOLVE MATH PROBLEMS	ED'L ACTV	AP,PE,TR	MA	AR	78.00
READABILITY ANALYSIS (SCH UTIL V2)	MECC	AP	LA	RE	36.70
READING LEVEL	SCH COUR J	AP,PE,TR	LA	RE	15.95
REDUCE FRACTION	MIC IN ED	PE	MA	AR	7.50
ROBOTWAR	MUSE	AP	CL	CP	39.95
ROCKY'S BOOTS	TLC	AP	PS,AR	PS,AR	75.00
ROUND (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR	MA	AR	37.10 D
ROUND (ELEMENTARY VOL. 1)	MECC	AP	MA	AR	38.80 D
ROUNDING	MIC IN ED	PE	MA	AR	7.50
RULER FRACTIONS	MIC IN ED	PE	MA	AR	7.50
SCRAMBLED LETTERS	ED'L ACTV	AP,AT,PE,TR	LA,TT	RE,SP	14.95
SCRIPSIT	RADIO SHAK	TR	LA	WR	99.95
SELL APPLES (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR	SS	EC	40.60 D
SELL BICYCLES (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR	SS	EC	40.60 D
SELL LEMONADE (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR	SS	EC	40.60 D
SELL PLANTS (ELEMENTARY VOL. 3)	MECC	AP,PE,IBM,TR	SS	EC	40.60 D
SHAPES (ELEMENTARY VOL. 7)	MECC	AP,PE,IBM,TR	MA	GM	38.50 D
SHAPES (PRE-READING)	MECC	AT	MA,PR	GM	38.50 D
SHELL GAMES	APPLE	AP	MA,LA,TT	AR,RE,WR	29.95
SIMULATED COMPUTER	EDU-SOFT	AP,AT,TR	CL	CP	14.95
SINE&COSINE GRAPHER	MATH SOFT	AP	MA	AD	175.00
SIR WILLIAM WRONG NOTE	MICRO MUS	AP	MU		190.00
SLOPE (GRAPHING)	MECC	AT,PE,IBM,TR	MA	AL,GM	40.80 D
SLOPE (MATH VOL. 1)	MECC	AP	MA	AL,GM	40.80 D
SMALLEST UNIT OF MEASURE	SCH COUR J	AP,PE,TR	MA	GM	15.95
SNARK (GRAPHING)	MECC	AT	MA	AL,GM	40.80 D
SNARK (MATH VOL. 1)	MECC	AP	MA	AL,GM	40.80 D
SNELL (SCIENCE VOL. 2)	MECC	AP	SC	PH	40.90 D
SNOOPER TROOPS	SPINNAKER	AP	LA,PS	RE,PS	44.95
SOCCER MATH	COMPUTATNS	AP	MA	AR	24.95

Preview Guide Titles & Prices (con't.)

TITLE	PUBL	COMPUTER	CURR AREA	SUBJ/TOPIC	PRICE
SOLAR DISTANCE (EARTH SCIENCE)	MECC	AT,PE,IBM,TR	SC	ES	37.40 D
SOLAR DISTANCE (ELEMENTARY VOL. 4)	MECC	AP	SC	ES	39.70 D
SOLV'G SIMULTANEOUS LIN SYST	MATH SOFT	AP	MA	AD	VARIES W/PKG
SPEED DRILL (BASIC ARITHMETIC)	MECC	AT,PE,IBM,TR	MA	AR	37.10 D
SPEED DRILL (ELEMENTARY VOL. 1)	MECC	AP	MA	AR	38.80 D
SPEED READER	APPLE	AP	LA	RE	70.00
SPELL (ELEMENTARY VOL. 2)	MECC	AP	LA,TT	SP	40.40 D
SPELL-N-TIME	SCH COUR J	AP,PE,TR	LA	SP	12.95
SPELLING	ED'L ACTV	AP,AT,PE,TR	LA	SP	29.95
SPELLING MACHINE	SW ED PSY	AP	LA	SP	49.95
SPELLING PACKAGE	TCH TOOLS	PE	LA	SP	99.95
SRA CLASSROOM MGMT SYSTEM	SRA	AP,AT	MA	AR	1,205.00
SRA DR & INSTR MATHEMATICS B	SRA	AP,AT	MA	AR	495.00
STATES & CAPITALS	ATARI	AT	SS	GE	14.95
STATISTICS	EDU-WARE	AP	MA,TT	AD	29.95
STEP BY STEP (NEW)	PRO DESIGN	AP	CL	CP	79.95
STERL (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP	SS,SC	EE,BI	24.95 D
SUBT CONCEPTS	MIC IN ED	PE	MA	AR	7.50
SUBT FACTS 0-10 & 0-20	MIC IN ED	PE	MA	AR	7.50 EACH
SUBTRACTION-ALL LEVELS	TCH TOOLS	PE	MA	AR	29.95
SUPERMAP	APPLE	AP	SS	GE	35.00
SUPERTEXT	MUSE	AP	LA	WR	175.00
SURVIVAL MATH	SUNBURST	AP,AT,TR	MA	AR	85.00
TAG (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,AP,PE	SC	EE	24.95 D
TAXMAN (ELEMENTARY VOL. 1)	MECC	AP	MA	AR	38.80 D
TAXMAN (METRIC & PROBLEM SOLV'G)	MECC	AT,PE,IBM,TR	MA	AR	36.80 D
TERRAPIN LOGO	TERRAPIN	AP	CL	CP	128.00
THREE MILE ISLAND	MUSE	AP	SC	PH	39.95
TI LOGO	TEXAS INST	TI	CL	CP	299.95
TIC TAC FACTS	MIC IN ED	PE	MA	AR	7.50
TICTACTOE SPELL	JMH	PE	LA	SP	24.95
TRAIL WEST	MICRO-ED	PE	SS	HI	7.95
TRAIN (ELEMENTARY VOL. 7)	MECC	AP,PE,IBM,TR	PR		38.50 D
TRAIN (PRE-READING)	MECC	AT	PR		38.50 D
URSA (EARTH SCIENCE)	MECC	AT,PE,IBM,TR	SC	ES	37.40 D
URSA (ELEMENTARY VOL. 4)	MECC	AP	SC	ES	39.70 D
VOCABULARY SKILLS	MILT BRAD	AP	LA		49.95
VOLCANOES	EARTHWARE	AP	SC	ES	49.50
VOWELS	HARTLEY	AP	LA	WR	93.95

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TITLE	PUBL	COMPUTER	CURR AREA	SUBJ/TOPIC	PRICE
WHAT'S DIFFERENT?	PRO DESIGN	AP,AT,PE,TR	LA	RE	23.95
WORD FAMILIES	HARTLEY	AP	LA	RE	29.95
WORD FIND (ELEMENTARY VOL. 2)	MECC	AP	LA		40.40
WORD PRO 4 PLUS	COMMODORE	PE	LA	WR	450.00
WORDGAME (ELEMENTARY VOL. 2)	MECC	AP	LA,TT	RE	40.40 D
WORDS (ELEMENTARY VOL. 7)	MECC	AP	PR		38.50 D
WORDS (PRE-READING)	MECC	AT,PE,IBM,TR	PR		38.50 D
WORDSTAR	MICROPRO	AP(CP/M)	LA	WR	
WUZZLE (ELEMENTARY VOL. 7)	MECC	AP	PR		38.50 D
WUZZLE (PRE-READING)	MECC	AT,PE,IBM,TR	PR		38.50 D
ZAP ADD 2-6 & 5-9	MIC IN ED	PE	MA	AR	7.50
ZAP MULT 2-6 & 5-9	MIC IN ED	PE	MA	AR	7.50

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ADDENDUM

Additional Software Suggested by South Carolina Microcomputer Planning Conference Participants

AREA	TITLE	PUBL	COMPUTER	K-3	4-6	MID	SEC	MODE
Art	Paint	Reston	AT	X	X	X	X	*
LA Reading	Vocabulary Skills: Prefix/Suffix	Milton Bradley	AP		X			TU,DP
	Vocabulary Skills:	Milton Bradley	AP		X			TU,DP
LA Spelling	Spelling	Zaner-Bloser	AP,PE,TR	X	X	X		
LA Writing	Message Master	Skill Corp	AP,TR	X	X	X	X	DP,TU,WP
	Sentence Combining	Milliken	AP		X	X		DP,TU
SAT Review	College Entrance Examination 1	Borg-Warner	AP				X	PS
	College Entrance Examination 2						X	
	The SAT Computer Assisted Test Preparation Kit	Coronado	AP,TR,IBM,AT				X	PS
Teaching Tools	Grade Manager	MECC	AP	X	X	X	X	UT
	Readability	Alpha Basics	AP,AT,PE,TR	X	X	X	X	CM

* Creative design; use of joystick required.

Publisher and Address

Alpha Basics Plus, Inc.
412 Deerwood Avenue
Orlando, FL 32817

Borg-Warner Educational Systems
600 W. University Drive
Arlington Heights, ILL 60004

Coronado Publishers, Inc.
1250 6th Avenue
San Diego, CA 92101

MECC
2520 Broadway Drive
St. Paul, MN 55113

Milliken Publishing
1100 Research Blvd.
St. Louis, MO 63132

Milton Bradley Company
Shaker Road
E. Longmeacow, MA 01028

Reston Publishing
11480 Sunset Hills Road
Reston, VA 22090

Skillcorp Publishers, Inc.
2300 West Fifth Ave., P. O. Box 712
Columbus, OH 43216

Zaner-Bloser
2500 West Fifth Ave., P. O. Box 16764
Columbus, OH 43216

SOFTWARE EVALUATION CHECKLIST

PROGRAM NAME _____ SOURCE _____ COST _____

SUBJECT AREA _____ REVIEWER'S NAME _____ DATE _____

1 INSTRUCTIONAL RANGE

_____ grade level(s)

_____ ability level(s)

2 INSTRUCTIONAL GROUPING FOR PROGRAM USE

_____ individual

_____ small group (size: _____)

_____ large group (size: _____)

3 EXECUTION TIME

_____ minutes (estimated) for average use

4 PROGRAM USE(S)

_____ drill or practice

_____ tutorial

_____ simulation

_____ instructional gaming

_____ problem solving

_____ informational

_____ other (_____)

5 USER ORIENTATION: INSTRUCTOR'S POINT OF VIEW

low				*high*	
•	•	•	•	•	flexibility
•	•	•	•	•	freedom from need to intervene or assist

6 USER ORIENTATION: STUDENT'S POINT OF VIEW

low				*high*	
•	•	•	•	•	quality of directions (clarity)
•	•	•	•	•	quality of output (content and tone)
•	•	•	•	•	quality of screen formatting
•	•	•	•	•	freedom from need for external information
•	•	•	•	•	freedom from disruption by system errors
•	•	•	•	•	simplicity of user input

7 CONTENT

low				*high*	
•	•	•	•	•	instructional focus
•	•	•	•	•	instructional significance
•	•	•	•	•	soundness or validity
•	•	•	•	•	compatibility with other materials used

8 MOTIVATION AND INSTRUCTIONAL STYLE

passive				*active*	
•	•	•	•	•	type of student involvement

low				*high*	
•	•	•	•	•	degree of student control

none	*poor*			*good*	
•	•	•	•	•	use of game format
•	•	•	•	•	use of still graphics
•	•	•	•	•	use of animation
•	•	•	•	•	use of color
•	•	•	•	•	use of voice input and output
•	•	•	•	•	use of nonvoice audio
•	•	•	•	•	use of light pen
•	•	•	•	•	use of ancillary materials
•	•	•	•	•	use of _____ _____

9 SOCIAL CHARACTERISTICS

present and negative	*not present*	*present and positive*	
_____	_____	_____	competition
_____	_____	_____	cooperation
_____	_____	_____	humanizing of computer
_____	_____	_____	moral issues or value judgments
_____	_____	_____	summary of student performance

Reprinted with permission from Guidelines for Evaluating Computerized Instructional Materials; available from NCTM, 1906 Association Drive, Reston, VA 22091.

1. The grade levels and ability levels for a particular program are primarily determined by the concepts involved. Other important factors are reading level, prerequisite skills, degree of student control, and intended instructional use. It is possible for a program to be flexible enough to be used across a wide range of grade levels and ability levels.

2. Some programs are designed for use by individuals. Others have been or can be modified for participation by two or three persons at a time. Simulations or demonstrations often pose opportunities for large group interaction. A given program may be used in more than one grouping, depending on the instructor.

3. The time required for the use of a program will vary considerably. Include loading time for cassettes. A time range is the appropriate response here.

4. Instructional programs can be categorized according to their uses. Some programs may have more than one use, thus falling into more than one of the following categories:

Drill or practice: Assumes that the concept or skill has been taught previously.

Tutorial: Directs the full cycle of the instructional process; a dialogue between the student and the computer.

Simulation: Models selected, alterable aspects of an environment.

Instructional gaming: Involves random events and the pursuit of a winning strategy.

Problem solving: Uses general algorithms common to one or more problems.

Informational: Generates information (data).

5. These are factors relevant to the actual use of the program from the point of view of an instructor.

Flexibility: A program may allow the user or the instructor to adjust the program to different ability levels, degrees of difficulty, or concepts.

Intervention or assistance: A rating of "low" means considerable teacher intervention or assistance is required.

6. These are factors relevant to the actual use of the program from the point of view of a student.

Directions: The directions should be complete, readable, under the user's control (e.g., should not scroll off the screen until understood), and use appropriate examples.

Output: Program responses should be readable, understandable, and complete. If in response to student input, the output should be of an acceptable tone and consistent with the input request.

Screen formatting: The formats during a program run should not be distracting or cluttered. Labels and symbols should be meaningful within the given context.

External information: A program may require the user to have access to information other than that provided within it. This may include prerequisite content knowledge or knowledge of conventions used by the program designer as well as maps, books, models, and so on.

System errors: System errors result in the involuntary termination of the program.

Input: A program should ensure that a user knows when and in what form input is needed. It should avoid using characters with special meanings, restrict input locations to particular screen areas, and require minimal typing.

7. These are matters relevant to the subject-matter content of the program.

Focus: The program topic should be clearly defined and of a scope that permits thorough treatment.

Significance: The instructional objectives of the program must be viewed as important by the instructor. Also, the program should represent a valid use of the computer's capabilities while improving the instructional process.

Soundness or validity: The concepts and terms employed should be correct, clear, and precise. Other important factors are the rate of presentation, degree of difficulty, and internal consistency.

Compatibility: The content, terminology, teaching style, and educational philosophy of the program should be consistent with those generally encountered by the student.

9. Competition, cooperation, and values are concerns that may be a function of the way a program expresses them. (War gaming and the "hangman" format are sample issues.) Also, the "humanizing" of the computer may serve for motivation or to reduce anxiety, but it also may become tedious, misleading, and counterproductive.

The summary of student performance can be dichotomous (win or lose), statistical (time expended or percent of items correct), or subjective (as in the evaluation of a simulation). It may be for student, teacher, or both.

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ANNOTATION

TO

PREPARING FOR COMPUTER USE

South Carolina Department of Education
Charlie G. Williams, Superintendent

Sidney B. Cooper, Deputy Superintendent
Division of Instruction

Clyde H. Green, Director
Office of Instructional Technology

March 1984

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INTRODUCTION

This annotation serves as a supplement to "Preparing for Computer Use." It provides a description of each software title listed and lists suggested hardware capacity for the three courses described in this publication.

SUGGESTED HARDWARE

COURSE	HARDWARE
1. Introduction to Computers	As a minimum, it is suggested that computers with 16K RAM with cassette recorder and monitor be provided. The recommended configuration for this course is computers with 48K RAM capacity and one disk drive, monitor and one printer.
2. Computer Mathematics	Computers with 48K RAM and one disk drive, monitor, and one printer per classroom is suggested as the minimum hardware for the course.
3. Advanced Placement Computer Science	The minimum configuration for this course is computers with 48K RAM and one disk drive, monitor, and one printer per classroom. Recommended for this course is above configuration with color monitor.

ANNOTATIONS FOR THE

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WRITTEN BY

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ALAMEDA, CALIFORNIA

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PREVIEW GUIDE ANNOTATIONS

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
ADD FACTS 0-5, 0-10, & 0-20	MIC IN ED	PE	TIMED PRACTICE IN ADDITION WITH SUMS RANGING FROM 0-5, 0-10, & 0-20
ADDITION & SUBTRACTION 1 & 2	SCOTT FORS	TI	DRILLS THESE OPERATIONS FIRST WITH 0-9, THEN WITH 0-18
ADDITION CONCEPTS	MIC IN ED	PE	TUTORIAL: PRACTICE IN BEGINNING ADDITION MAKES MUCH USE OF GRAPHICS
ADDITION TABLE	MIC IN ED	PE	PRACTICE IN ADDITION OF NUMBERS 1 THROUGH 9 USING A GRID OF SUMS
ADDITION-ALL LEVELS	TCH TOOLS	PE	ADDITION DRILL ON 24 LEVELS WITH TEACHER CONTROL OF TIME AND NUMBER OF TRIES
ADVANCED GRAPHICS	RADIO SHAK	TR	GRAPHS PRESET POLAR AND PARAMETRIC EQUATIONS
ADVENTURE 5,6,7,8	ADV INT'L	AP,TI,TR	TWO-WORD COMMANDS MOVE STUDENTS THROUGH FOUR ADVENTURE PUZZLES
ADVENTURE 9,10,11,12	ADV INT'L	AP,TI,TR	SOLVE FOUR DIFFICULT ADVENTURE PUZZLES, OBEYING RULES & USING COMMANDS
AESTHEOMETRY	MECC	AP	GRAPHIC DISPLAY CONSTRUCTS AND NAMES LINES, CURVES AND GEOMETRIC FIGURES
ALGEBRA (MATH VOL. 1)	MECC	AP	DRILL IN THE SOLUTION OF LINEAR EQUATIONS
ALGEBRA 1	EDU-WARE	AP	COMPUTER-ASSISTED INSTRUCTION ON PRE-ALGEBRA TOPICS THROUGH LINEAR EQUATIONS
ALGEBRA BILLIARDS	CURR APP	TR	DRILL IN SOLVING LINEAR EQUATIONS IN THE GUISE OF A BILLIARD GAME
ALIEN ADDITION	DLM	AP	ARCADE GAME FORMAT REQUIRES QUICK ADDITION OF NUMBERS 0-9

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PREVIEW GUIDE ANNOTATIONS

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
ALLIGATOR MIX	DLM	AP,PE,TR	STUDENTS PRACTICE ADDITION & SUBTRACTION OF NUMBERS 0-9 IN ARCADE GAME FORMAT
ALPHABET	MIC IN ED	PE	FIND MISSING LETTER IN DISPLAY OF SEVEN CONSECUTIVE LETTERS OF ALPHABET
ALPHABETIZATION	MILLIKEN	AP	DRILL IN LETTER RECOGNITION AND ALPHABETIZING THROUGH THE SEVENTH LETTER
AMAZING (ELEMENTARY VOL.2)	MECC	AP	PROVIDES TEACHER GENERATED WORKSHEET: A MAZE WITH SINGLE ENTRANCE & SOLUTION
ANTFARM	WIMS	AP	SIX COMMANDS MANAGE ANTS IN AN ANT FARM AND INTRODUCE THE LOGIC OF PROGRAMMING
APPLE LOGO	APPLE	AP	CREATING COLOR GRAPHICS, STUDENTS LEARN STRUCTURED PROGRAMMING CONCEPTS
APPLE PASCAL	APPLE	AP	UCSD PASCAL WITH COLOR GRAPHICS AND SOUND GENERATION
APPLE PILOT	APPLE	AP	AUTHORING LANGUAGE: TEACHERS CREATE LESSONS USING GRAPHICS, TEXT & SOUND
APPLE-BASED EL MATH CLS:FRA/DC	STER SWIFT	AP	MANAGEMENT OF 40 STUDENTS IN DRILL ON THE USE OF FRACTIONS AND DECIMALS
APPLE-BASED EL MATH CLS:WHOLE #	STER SWIFT	AP	MANAGEMENT OF 40 STUDENTS IN DRILL ON THE FOUR OPERATIONS WITH WHOLE NUMBERS
APPLEWRITER	APPLE	AP	WORD PROCESSING PROGRAM ALLOWS USER TO WRITE, FORMAT, EDIT & PRINT TEXT
APPROXIMATE MEASUREMENT 1	SCH COUR J	AP,PE,TR	INTRODUCES THE NOTION OF ERROR MEASUREMENT USING SCREEN AND EXAMPLES

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PREVIEW GUIDE ANNOTATIONS

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
APPROXIMATE MEASUREMENT 2	SCH COUR J	AP,PE,TR	REINFORCES THE CONCEPT OF ERROR IN MEASUREMENT BY REPEATED EXAMPLES
ARISTOTLE'S APPLE	STONEWARE	AP	ALLOWS TEACHER TO CREATE MULTIPLE CHOICE, COLUMN MATCHING AND FILL-IN TESTS
ARITH-MAGIC	QED	AP,PE,TR	PRACTICE IN WHOLE NUMBER OPERATIONS AND EXPLORATION OF PATTERNS
ARITHMETIC CLASSRM:ADDITION	STER SWIFT	AP	TUTORIAL AND DRILL IN ADDITION OF WHOLE NUMBERS, ONE TO FOUR DIGITS
ARITHMETIC CLASSRM: DIVISION	STER SWIFT	AP	TUTORIAL AND DRILL IN DIVISION OF WHOLE NUMBERS
ARITHMETIC CLASSRM:MULTIPLICAT	STER SWIFT	AP	TUTORIAL AND DRILL IN MULTIPLICATION OF WHOLE NUMBERS
ARITHMETIC OF FUNCTIONS	MATH SOFT	AP	THE ARITHMETIC OF FUNCTIONS DEMONSTRATED WITH TWO-DIMENSIONAL GRAPHING
ARNOLD	MICRO MUS	AP	DRILL IN IDENTIFICATION OF MUSICAL INTERVALS BY EAR AND BY NOTATION
ART-PERSPECTIVE DRAWING	MECC	AP	DEMONSTRATES DRAWING IN ONE-POINT AND TWO-POINT PERSPECTIVE
ATARI PILOT	ATARI	AT	PROGRAMMING LANGUAGE WITH SOUND CAPABILITY AND TURTLE GRAPHICS
BAGELS (MATH VOL.1 & ELEM VOL.1)	MECC	AP	STUDENTS IDENTIFY A SECRET 2-4 DIGIT NUMBER BY SERIES OF LOGICAL GUESSES
BAGELS (METRIC & PROB SOLVING)	MECC	AT	STUDENTS IDENTIFY A SECRET 2-4 DIGIT NUMBER BY SERIES OF LOGICAL GUESSES

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
BANK STREET WRITER	SCHOLASTIC	AP,AT	WORD PROCESSOR FOR YOUNG CHILDREN: THEY WRITE, EDIT & PRINT THEIR WRITING
BASE 10 (BASIC ARITHMETIC)	MECC	AT	PRACTICE IN MULTIPLICATION USING MULTIPLES OF TEN AND DECIMALS
BASE 10 (ELEMENTARY VOL. 1)	MECC	AP	PRACTICE IN MULTIPLICATION USING MULTIPLES OF TEN AND DECIMALS
BASIC INSTR COURSE	RADIO SHAK	TR	TUTORIAL IN THE USE OF THE LANGUAGE BASIC
BIRDBREED	EDUTECH	AP	SIMULATION: TEACHES GENETIC PRINCIPLES BY STUDENT EXPERIMENTATION & DISCOVERY
BIRTH OF THE PHOENIX	PHOENIX	AP,PE	TEXT-ONLY ADVENTURE WHICH REQUIRES READING, MAPPING & ATTENTION TO DETAIL
BOOKSHELF	MIC IN ED	PE	PRACTICE IN SHELVING BY DEWEY NUMBER AND AUTHOR
BUFFALO (ECOLOGY SIMULATION 1)	CRE CMP	TR,AP,PE	SIMULATION ALLOWS USER TO ANALYZE ECOLOGICAL CONTEXT OF BUFFALO HERD SIZE
BUMBLE GAMES	TLC	AP	PRACTICE IN PLOTTING NUMBER PAIRS ON A GRID WITH POSITIVE & NEGATIVE NUMBERS
BUMBLE PLOT	TLC	AP	BUILDING ON BUMBLE GAMES, DEVELOPS SKILL IN PLOTTING NUMBER PAIRS
CACTUSPLOT	CACTUS	AP	GRAPHS PROPERTIES OF FUNCTIONS IN COLOR; SUITABLE FOR ALGEBRA & CALCULUS
CALENDAR	JMH	AT	PRACTICE IN NAMING CONSECUTIVE DAYS OF THE WEEK OR MONTHS OF THE YEAR
CALENDAR	MIC IN ED	PE	PRACTICE IN NAMING CONSECUTIVE DAYS OF THE WEEK OR MONTHS OF THE YEAR

PREVIEW GUIDE ANNOTATIONS

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
CAPITALIZATION	HARTLEY	AP	DRILL: RULES OF CAPITALIZATION APPLIED TO PROBLEMS; TEACHER INPUT POSSIBLE
CARTELS & CUTTHROATS	STRAT SIMS	AP	COMPLEX, REALISTIC BUSINESS MANAGEMENT SIMULATION FOR SEVERAL PLAYERS
CATERPILLAR (ELEMENTARY VOL.7)	MECC	AP	DRILL ON ALPHABETIC SEQUENCE USING UPPER CASE LETTERS
CATERPILLAR (PRE-READING)	MECC	AT	DRILL ON ALPHABETIC SEQUENCE USING UPPER CASE LETTERS
CHANGE (BASIC ARITHMETIC)	MECC	AT	DRILL ON SELECTING THE RIGHT METHOD FOR MAKING CHANGE
CHANGE (ELEMENTARY VOL. 1)	MECC	AP	DRILL ON SELECTING THE RIGHT METHOD FOR MAKING CHANGE
CHEM LAB SIMULATION #1	HIGH TECH	AP	GRAPHICS GIVE USER REALISTIC CONTROL OVER THREE TITRATION EXPERIMENTS
CLOCK	HARTLEY	AP	DRILL IN TELLING TIME, RELATING THE CLOCK FACE TO WRITTEN EXPRESSIONS
CLOCK	MIC IN ED	PE	DRILL ON TELLING TIME ON THE CLOCK FACE AND IN WRITTEN EXPRESSION
COLLIDE (SCIENCE VOL.2)	MECC	AP	SIMULATED COLLISION OF TWO BODIES DEMONSTRATES LAW OF CONSERVATION OF ENERGY
COLUMN ADD	MIC IN ED	PE	PRACTICE IN COLUMN ADDITION OF 3, 5 & 7 TWO- AND THREE-DIGIT NUMBERS
COMPARE FRACTIONS	MIC IN ED	PE	COMPARISON OF FRACTIONS: IS ONE GREATER THAN, LESS THAN OR EQUAL TO ANOTHER?

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
COMPARE FRACTIONS	MIC IN ED	PE	COMPARISON OF FRACTIONS: IS ONE GREATER THAN, LESS THAN OR EQUAL TO ANOTHER?
COMPREHENSION POWER	MILLIKEN	AP	MANAGEMENT AND TUTORIAL SYSTEM IN READING COMPREHENSION & STUDY SKILLS
COMPUPOEM	SCWRIP	AP	PLAYFUL ENCOURAGEMENT TO WRITE POEMS; COMPUTER SUPPLIES FORM; STUDENTS, WORDS
COMPUTER DISCOVERY	SRA	AP,AT,TR	COMPREHENSIVE COMPUTER LITERACY PACKAGE WITH DISKS, WORKBOOKS & GUIDE
COMPUTER GRAPHING EXPERIMENTS	ADD-WESLEY	AP	STUDENTS RECORD & GRAPH DATA USING LINEAR, QUADRATIC, TRIG & LOG FUNCTIONS
COMPUTER MATH GAME	ADD-WESLEY	AP	ONE TO FOUR STUDENTS PRACTICE BASIC MATH OPERATIONS, PERCENTS & FRACTIONS
CONVERSION LESSON (MATH VOL.2)	MECC	AP	TUTORIAL ON CONVERSION OF ENGLISH UNITS OF MEASUREMENT OF LIQUID & LENGTH
COUNTING 1	MIC IN ED	PE	DRILL ON RELATING NUMERALS TO THE NUMBER OF SHAPES COUNTED ON THE SCREEN
CROSS CLUES	SRA	AP	TWO-PLAYER WORD-GUESSING GAME USING A CROSSWORD-STYLE GRID
CROSSWORD MAGIC	L&S COMP	AP, AT	USER PROVIDES WORD LIST & CLUES; COMPUTER MAKES THEM INTO A PUZZLE
CUSTOMIZED FLASH SPELL	RANDOM	AP,TR	WORD FLASHED ON SCREEN MUST BE TYPED BY STUDENT; TEACHER MAY SUPPLY WORDS
DARTS	COMPUWARE	PE	TIMED ARITHMETIC PROBLEMS REWARD ESTIMATION SKILLS WITH DARTBOARD BULLSEYES
DECIMAL ESTIMATION	SCH COUR J	AP,PE,TR	GAME: GIVES PRACTICE IN ESTIMATING PLACE OF THE DECIMAL IN A PRODUCT

PREVIEW GUIDE ANNOTATIONS

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
DELTA DRAWING	SPINNAKER	AP,AT	USING SIMPLE COMMANDS YOUNG STUDENTS PROGRAM AS THEY CREATE COLORED DESIGNS
DEMOLITION DIVISION	DLM	AP	ARCADE GAME FORMAT: DIVISION OF NUMBERS 0-9 FIRES LASERS AT TANK ATTACK
DICTIONARY GUIDE WORDS	MICRO-ED	PE	DRILL: STUDENTS MATCH WORDS TO APPROPRIATE PAIR OF DICTIONARY GUIDE WORDS
DIET (ECOLOGY SIMULATIONS 2)	CRE CMP	AP,PE,TR	MANAGEMENT AND TUTORIAL ON DIVISION WITH ONE- AND TWO-DIGIT DIVISORS
DOREMI	MICRO MUS	AP	TEACHES THE AURAL IDENTIFICATION OF THE INTERVALS OF THE MAJOR SCALE
DRAGON GAME SERIES	ED'L ACTV	AP,AT,PE,TR	DRILL: IDENTIFICATION OF PARTS OF SPEECH, CONTRACTIONS, SYNONYMS, ETC
DRAGON MIX	DLM	AP	STUDENTS MULTIPLY & DIVIDE NUMBERS 0-9 IN THIS DRILL IN ARCADE GAME FORMAT
DRAGSTRIP MATH	MIC IN ED	PE	COMPETITIVE DRILL ON ARITHMETIC FACTS: CORRECT ANSWERS MOVE CARS TO FINISH
DUELING DIGITS	BRODERBUND	AP	PLAYERS COMPETE TO CAPTURE NUMBERS & OPERANDS AND TO CONSTRUCT EQUATIONS
E-Z PILOT	TECK ASSOC	AP	UPDATED VERSION OF PILOT LANGUAGE USING 10 INSTRUCTIONS
EARLY LEARNING FUN	TEXAS INST	TI	MISCELLANEOUS READINESS ACTIVITIES INVOLVING LETTERS, NUMBERS & SHAPES
EARLY READING	SCOTT FORS	TI	A ROBOT-READ STORY IS THE REWARD FOR IDENTIFYING WORDS FROM CONTEXT CLUES
ECOLOGY SIMULATIONS 2	CRE CMP	AP,TR,PE	SIMULATION ON FOUR TOPICS; DIET AND THE CONTROL OF WASTE, RATS & MALARIA
ELEMENTARY VOL. 8-GEOMETRY	MECC	AP	TUTORIAL AND QUIZ ON POINTS AND ON ANGLES

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
ELEMENTARY VOL. 9-GEOMETRY	MECC	AP	TUTORIAL AND QUIZ ON LINES AND ON TRIANGLES
ELEMENTARY VOL. 10-GEOMETRY	MECC	AP	TUTORIAL AND QUIZ ON QUADRILATERALS & ON THE AREA & PERIMETER OF FIGURES
ELEMENTARY, MY DEAR APPLE	APPLE	AP	FOUR GAMES: PRACTICE IN WORD RECOGNITION, SPELLING, BASIC MATH & FRACTIONS
ESSENTIAL MATH PROGRAM	RADIO SHAK	TR	MATH MANAGEMENT PACKAGE COVERING TOPICS FROM NUMBER CONCEPTS TO PRE-ALGEBRA
ESTIMATE (BASIC ARITHMETIC)	MECC	AT	DRILL ON ESTIMATING ANSWERS FOR THE FOUR OPERATIONS & PERCENTS
ESTIMATE (ELEMENTARY VOL.4)	MECC	AP	DRILL ON ESTIMATING ANSWERS FOR THE FOUR OPERATIONS & PERCENTS
FACEMAKER	SPINNAKER	AP,AT	USER DESIGNS AND ANIMATES A FACE THUS LEARNING THE STEPS OF PROGRAMMING
FACT TRACK	SRA	AT	DRILL ON SINGLE DIGIT COMPUTATION FOR THE FOUR OPERATIONS
FACTORING WHOLE NUMBERS	QED	AP,TR	REVIEW DRILLS & ADDITIONAL PRACTICE ON TOPICS IN FACTORING WHOLE NUMBERS
FACTORY	SUNBURST	AT	SIMULATION: PRODUCTION LINE DESIGN TEACHES SEQUENCING & INDUCTIVE REASONING
FAST ADD	MIC IN ED	PE	PRACTICE IN ADDING ONE- AND TWO-DIGIT NUMBERS WITH NINE LEVELS OF DIFFICULTY
FLASH SPELLING	ED'L ACTV	AP,PE,TR	USER MUST TYPE WORD WHICH HAS FLASHED, LETTER BY LETTER, ON THE SCREEN
FRACTION-EQUV 1	MIC IN ED	PE	DRILL & TUTORIAL IN MATCHING GIVEN FRACTION TO AN EQUIVALENT FRACTION
FRACTIONS	QED	AP,TR	TUTORIAL & GAMES ON CONCEPTS & OPERATIONS WITH FRACTIONS

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TITLE	PUBLISHER	COMPUTER	DESCRIPTION
FRACTION 1 & 2	MIC IN ED	PE	TUTORIAL & PRACTICE ON CONCEPTS OF ONE-FOURTH, ONE-THIRD & ONE-HALF
FRACTIONS EQUIVALENT 1	JMH	AT	DRILL AND TUTORIAL IN MATCHING GIVEN FRACTION TO AN EQUIVALENT FRACTION
FRACTIONS-ADD, SUB, MULT, DIV	ED'L ACTV	AP	DRILL ON OPERATIONS OF FRACTIONS WITH EXAMPLES RANDOMLY CHOSEN
FRACTIONS: A REVIEW	BLS	AP	BASIC AND REMEDIAL INSTRUCTION IN CONCEPTS AND FOUR FUNDAMENTAL OPERATIONS
FUNCTION GRAPHER	MATH SOFT	A?	USER CHOOSES FUNCTION & SUPPLIES COEFFICIENT; COMPUTER THEN GRAPHS FUNCTION
FUNDAMENTAL MATHEMATICS I	RANDOM	TR	COMPREHENSIVE DRILL OF ESSENTIAL PRIMARY MATH SKILLS
FUNDAMENTAL MATHEMATICS II	RANDOM	TR	COMPREHENSIVE DRILL OF ESSENTIAL INTERMEDIATE MATH SKILLS
FUNDAMENTAL MATHEMATICS III	RANDOM	TR	COMPREHENSIVE DRILL OF ESSENTIAL MATH SKILLS THROUGH PRE-ALGEBRA
GAME SHOW	COM-ADV ID	AP	PASSWORD FORMAT GAME: USERS MAY ADD SUBJECTS AND WORDS TO THOSE PROVIDED
GEOBOARD GEOMETRY & MEASUREMENT	CUISENAIRE	AP	GEOBOARD PRACTICE IN MEASUREMENT & CONCEPTS OF AREA & PERIMETER OF FIGURES
GEOGRAPHY SEARCH	MCGRAW-HIL	AP,TR	SIMULATION: DECISIONS, RIGORS OF A VOYAGE TO DISCOVER THE NEW WORLD
GEOLOGY SEARCH	MCGRAW-HIL	AP,TR	SIMULATION: FINANCIAL & TECHNICAL PROBLEMS OF SELECTING AN OIL DRILLING SITE
GEOMETRY AND MEASUREMENT	APPLE	AP	DRILLS ON TERMS AND CONCEPTS SUCH AS LENGTH, PERIMETER, AREA AND VOLUME

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TITLE	PUBLISHER	COMPUTER	DESCRIPTION
GERTRUDE'S PUZZLES	TLC	AP	SIMPLE PRACTICE IN FINDING PATTERNS IN COLORS & SHAPES
GERTRUDE'S SECRETS	TLC	AP	STUDENTS PRACTICE LOGICAL THINKING AS THEY FIND PATTERNS IN COLORS & SHAPES
GOLF	MIC IN ED	PE	DRILL ON ADDITION & SUBTRACTION OF GIVEN NUMBERS TO ARRIVE AT PAR
GRAPHIC INTEGRATION THEORY	MATH SOFT	AP	GRAPHIC DEMONSTRATION OF THE UPPER AND LOWER LIMITS OF INTEGRATION
GRAPHING	ED'L ACTV	AP,PE,TR	TUTORIAL: GRAPHING AND PLOTTING POINTS ON THE COORDINATE PLANE
GRID SEARCH	CREAT PUBS	AP,PE,TR	GAME SERIES: USER, GIVEN COORDINATES, LOCATES A POINT ON A GRID
GUESS THE RULE	EDU-SOFT	AP	GIVEN ORDERED NUMBER PAIRS, USER DETERMINES COEFFICIENTS FOR GIVEN FUNCTIONS
HABER	CONDUIT	AP,TR	SIMULATION: HOW VARIOUS CONDITIONS INFLUENCE REACTIONS IN AMMONIA SYNTHESIS
HODGE PODGE	DYNACOMP	AP	APPLES TO ZIGZAGS, EACH KEY PRODUCES A DIFFERENT DISPLAY FOR THE CHILD
HOW TO PROGRAM IN BASIC	STER SWIFT	AP	TWELVE TUTORIALS AND A WORKBOOK TEACH BASIC PROGRAMMING
HURKLE (ELEMENTARY VOL. 1)	MECC	AP	PRACTICE IN LOCATING POINTS ON A NUMBER LINE, COORDINATE SYSTEM & GRID
HURKLE (METRIC & PROB SOLVING)	MECC	AT	PRACTICE IN LOCATING POINTS ON A NUMBER LINE, COORDINATE SYSTEM & GRID
ICBM (GRAPHING)	MECC	AT	SIMULATION, USING TRIGONOMETRIC FUNCTIONS, OF ICBM
ICBM (MATH VOL.1 & SCIENCE VOL.2)	MECC	AP	SIMULATION, USING TRIGONOMETRIC FUNCTIONS, OF THE ICBM

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
IMPROP FRACT 1, 2, & 3	MIC IN ED	PE	TUTORIAL IN CHANGING IMPROPER FRACTIONS TO MIXED FRACTIONS AND BACK
INTERVAL MANIA	MICRO MUS	AP	TUTORIAL IN AURAL & VISUAL IDENTIFICATION OF MELODIC & HARMONIC INTERVALS
JUGGLES' RAINBOW	TLC	AP	REINFORCES THE CONCEPTS OF LEFT & RIGHT, ABOVE & BELOW
K-8 MATH PROGRAM	RADIO SHAK	TR	MANAGEMENT & DRILL ON THE FOUR OPERATIONS OF ARITHMETIC, CORRELATED TO TEXT
K-8 MATH WORKSHEET GENERATOR	RADIO SHAK	TR	PRINTS WORKSHEETS & ANSWER SHEETS FROM K-8 MATH LESSONS (REQUIRES PRINTER)
KAREL THE ROBOT	CYBERTRON	AP	INTRODUCES STRUCTURED PROGRAMMING AND THE CONTROL STRUCTURES OF PASCAL
KIDSTUFF	JL HAMMETT	PE	SIMPLE PROGRAMMING LANGUAGE ALLOWS USERS TO MAKE PICTURES AND MUSIC
LANGUAGE ARTS SEQUENCES	MILLIKEN	AP	TUTORIAL: ACTIVITIES DRILLING ON LETTER RECOGNITION & ALPHABETIZATION SKILLS
LESSONS IN ALGEBRA	GEO EARL	AP	TUTORIAL AND DRILL ON TOPICS IN BEGINNING ALGEBRA
LETTERS & NUMBERS	TCH TOOLS	PE	PRACTICE IN MATCHING KEYS OF THE COMPUTER TO LETTERS & NUMBERS ON THE SCREEN
LIMITS OF SEQUENCES	MATH SOFT	AP	PROVIDES GRAPHIC INTERPRETATION OF THE DEFINITION OF LIMIT OF SEQUENCE
MAGIC SPELLS	APPLE	AP	SCRAMBLED WORDS GAME USES SPELLING DEMON'S WORD LISTS OR USER'S OWN WORDS
MAGIC WINDOW	ARTSCI	AP	WORD PROCESSING PROGRAM PROVIDES EASY FORMATTING, EDITING AND PRINTING
MARKETPLACE	MECC	AT	FOUR SHORT SIMULATIONS PUT THE USER IN THE MARKETPLACE SELLING APPLES, ETC.

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
MASTERTYPE	LIGHTNING	AP,AT	ARCADE GAME FORMAT: STUDENTS LEARN TOUCH TYPING & IMPROVE THEIR SPEED
MATCH GAME	TCH TOOLS	AP,PE	PRACTICE IN FINDING EXACT OR PAIRED MATCHES IN DATA; USER CAN ENTER ITEMS
MATH IDEAS WITH BASE TEN BLOCKS	CUISENAIRE	AP	TUTORIAL: SERIES OF EXERCISES USING BASE-TEN BLOCKS TO TEACH NUMBER CONCEPTS
MATH MACHINE	SW ED PSY	AP	COMPREHENSIVE PROGRAM OF DRILL ON ELEMENTARY MATH FACTS
MATH SKILL GAMES	MCGRAW-HIL	PE	DRILL & PRACTICE ON ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION
MATH SWIM	MIC IN ED	PE	DRILL; TWO PLAYERS COMPETE, USING THE FOUR OPERATIONS OF ARITHMETIC
MATHEMATICS VOL.2 (MEASUREMENT)	MECC	AP	DRILL: CONVERSION, ETC. OF ENGLISH MEASURES OF LENGTH, LIQUID, TIME & WEIGHT
MATHEMATICS VOL. 3 (GEOMETRY)	MECC	AP	DRILL: GEOMETRIC SHAPES, THE CALCULATIONS OF THEIR AREAS & PERIMETERS
MATHEMATICS VOL. 4 (ADVANCED)	MECC	AP	PRACTICE IN PROBLEM-SOLVING IN FINITE MATH, STATISTICS & CALCULUS
MATHWARE	MATH CITY	AP	PRACTICE IN THE FOUR OPERATIONS OF WHOLE NUMBERS, FRACTIONS & DECIMALS
MEET THE PRESIDENTS	VERSA	AP	CORRECTLY ANSWERED QUESTIONS GRADUALLY DISPLAY PORTRAIT OF EACH PRESIDENT
MELODIOUS DICTATOR	MICRO MUS	AP	TUTORIAL: TEACHES THE SKILL OF WRITING MUSIC FROM DICTATION
METEOR MULTIPLICATION	DLM	AP	ARCADE GAME FORMAT: TO SAVE THE STAR STATION STUDENTS MULTIPLY NUMBERS 0-9

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TITLE	PUBLISHER	COMPUTER	DESCRIPTION
METRIC 21 (ELEMENTARY VOL.1)	MECC	AP	DRILL: STUDENTS APPROXIMATE & ADD THE LENGTH OF LINE SEGMENTS
METRIC 21 (METRIC & PROB SOLVING)	MECC	AT	DRILL: STUDENTS ESTIMATE LENGTH OF LINE SEGMENT IN CENTIMETERS & MILLIMETERS
METRIC ESTIMATE (ELEMENTARY VOL.1)	MECC	AP	DRILL: STUDENTS ESTIMATE LENGTH OF LINE SEGMENT IN CENTIMETERS & MILLIMETERS
METRIC ESTIMATE (METR & PROB SOL)	MECC	AT	DRILL: STUDENTS ESTIMATE LENGTH OF LINE SEGMENT IN CENTIMETERS & MILLIMETERS
MICROMETER (DRIVER ED/IND ARTS)	MECC	AP	DRILL AND TUTORIAL ON READING A MICROMETER
MILLIKEN MATH SEQUENCES	MILLIKEN	AP,AT,PE,TR	PRACTICE IN ELEMENTARY MATH SKILLS FROM NUMBER READINESS THROUGH DECIMALS
MINDSTRETCHER SERIES	ISL SOFTWR	PE	TEN LOGIC PUZZLES IN GAME FORMAT: SOME FOR ONE PLAYER, SOME FOR MORE
MINERALS (EARTH SCIENCES)	MECC	AT	DRILL & TUTORIAL ON MINERAL IDENTIFICATION BY OBSERVATION AND TESTS
MINERALS (SCIENCE VOL.3)	MECC	AP	DRILL & TUTORIAL ON MINERAL IDENTIFICATION BY OBSERVATION AND TESTS
MINUS MISSION	DLM	AP	ARCADE GAME FORMAT REQUIRES QUICK SUBTRACTION OF NUMBERS 0-9
MIXED FRACT 1, 2, & 3	MIC IN ED	PE	DRILL: A QUANTITY SHOWN AS DIAGRAM, MIXED FRACTION & IMPROPER FRACTION
MIXUP (ELEMENTARY VOL.2)	MECC	AP	GAME: UNSCRAMBLING SCRAMBLED WORDS; USER MAY ENTER WORD LIST
MOPTOWN	APPLE	AP	ELEVEN LOGIC GAMES REQUIRE IDENTIFICATION AND SEQUENCING OF ATTRIBUTES
MOPTOWN HOTEL	FOLLETT	TRC	USERS CREATE ATTRIBUTE PATTERN IN THIS COMPETITIVE LOGIC GAME

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
MOPTOWN PARADE	FOLLETT	TRC	LOGIC GAME; USER ORDERS AND SEQUENCES BY ATTRIBUTES AS THE MOPPETS PARADE
MU MATH	MICROSOFT	AP	ALLOWS CALCULATIONS IN NEW SYMBOLIC MATH SYSTEM USING THE LANGUAGE MUSIMP
MULT FACTS 0-25 & 0-100	MIC IN ED	PE	TIMED DRILL IN MULTIPLICATION WITH PRODUCTS RANGING FROM 0-25 & 0-100
MULTIPLICATION 1	SCOTT FORS	TI	TUTORIAL AND DRILL ON MULTIPLICATION FACTS WITH FACTORS THROUGH 9
MUSIC COMPOSER	MICRO MUS	AP	MUSIC EDITOR WHICH ALLOWS USER TO COMPOSE, TRANSCRIBE & SAVE COMPOSITION
MUSIC THEORY	MECC	APP	EIGHTEEN DRILL & PRACTICE PROGRAMS ON THE FUNDAMENTALS OF MUSIC
MYSTERY HOUSE	ON-LINE	AP	ADVENTURE GAME WITH RULES OF PLAY, CLUES, TREASURE AND HIDDEN DANGER
N-LV-ADJ PATTERN	MIC IN ED	PE	DRILL ON FINDING THE NOUN PHRASES, LINKING VERB & ADJECTIVE IN A SENTENCE
NEWBERY AWARD WINNERS	SUNBURST	AP,PE,TR	COMPREHENSION & VOCABULARY DRILL AND GAMES WITH GUIDES FOR 15 NEWBERY BOOKS
NEWTON 2 (SCIENCE VOL.1)	MECC	AP	GAME REQUIRING VECTOR ADDITION & USE OF NORTH/SOUTH COORDINATE SYSTEM
NUMBER MAGIC	TEXAS INST	TI	TIMED OR UNTIMED NUMBER QUIZZES WITH WIDE RANGE OF DIFFICULTY
NUMBER SEQ 1 & 2	MIC IN ED	PE	PRACTICE: USER IDENTIFIES MISSING NUMBER FROM A SEQUENCE, 0-9 OR 10-99
NUMBER SEQUENCE	JMH	PE	SUPPLY THE MISSING NUMBER IN A SEQUENCE; THREE LEVELS OF DIFFICULTY

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TITLE	PUBLISHER	COMPUTER	DESCRIPTION
NUMBER SERIES	PRO DESIGN	AP,AT,PE,TR	EIGHT INCREASINGLY DIFFICULT EXERCISES ON THE ANALYSIS OF NUMBER SERIES
NUTRITION-VOLUME 1	MECC	AP	PROVIDES ANALYSIS OF GIVEN DAILY FOOD INTAKE, LISTS SOURCES OF NUTRIENTS
ODELL LAKE (ELEMENTARY BIOLOGY)	MECC	AT	SIMULATION: ROLE-PLAYING FOR SURVIVAL OF VARIOUS FISH IN LAKE FOOD CHAIN
ODELL LAKE (SCIENCE VOL.3)	MECC	AP	SIMULATION: ROLE-PLAYING FOR SURVIVAL OF VARIOUS FISH IN LAKE FOOD CHAIN
OREGON (ELEMENTARY VOL.6)	MECC	AP	SIMULATION: WILL SUPPLIES LAST THROUGH THE DIFFICULTIES OF THE OREGON TRAIL?
PAPERMATE	AB COMP	PE	SIMPLE 60-COMMAND WORD PROCESSING PROGRAM: SCREEN EDITING & TEXT FORMATTING
PHYSICS COMPULAB	EDUTECH	AP	SIX SIMULATED PHYSICS EXPERIMENTS ENHANCE STUDENTS' LAB EXPERIENCE
PICTURES (ELEMENTARY VOL.7)	MECC	AP	CONCENTRATION-GAME FORMAT GIVES PRACTICE IN MATCHING AND RECALL
PICTURES (PRE-READING)	MECC	AT	CONCENTRATION-GAME FORMAT GIVES PRACTICE IN MATCHING AND RECALL
PLACE VALUE 1	MIC IN ED	PE	DRILL ON PLACE VALUE AT FOUR LEVELS OF DIFFICULTY
PLOT	EDU-SOFT	AP	GRAPHS EQUATIONS, CONIC SECTIONS AND TRIG, EXPONENTIAL & LOG FUNCTION
POP (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP	SIMULATION: EXPLORES SEVERAL MODELS OF POPULATION GROWTH
PRACTICANDO ESPANOL	CONDUIT	AP	SPANISH-LANGUAGE DRILL IN VOCABULARY AND IN VERBS IN ALL TENSES

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TITLE	PUBLISHER	COMPUTER	DESCRIPTION
PREFIXES (ELEMENTARY VOL.5)	MECC	AP	TUTORIAL AND DRILL ON THE FIVE MOST COMMONLY USED PREFIXES
PRESCRIPTIVE MATH DRILL	HARTLEY	AP	DRILL ON THE FOUR MATH OPERATIONS; TEACHER SETS LEVEL & ACCURACY REQUIRED
PRESIDENT ELECT	STRAT SIM	AP	SIMULATES POLITICAL CLIMATE OF PRESIDENTIAL ELECTIONS, 1960-PRESENT
PUNCTUATION	ED'L ACTV	AP	TUTORIAL WITH SOUND ON USE OF PERIOD, QUESTION MARK & EXCLAMATION POINT
PUNCTUATION SKILL:COMMAS	MILT BRAD	AP	TUTORIAL AND PRACTICE ON USE OF THE COMMA
PUNCTUATION SKILLS:END MARKS	MILT BRAD	AP	TUTORIAL AND PRACTICE ON USE OF PUNCTUATION AT END OF CLAUSES & SENTENCES
QUAKES (EARTH SCIENCE)	MECC	AT	SIMULATION; STUDENTS CALCULATE THE LOCATION OF AN EARTHQUAKE
QUAKES (SCIENCE VOL.3)	MECC	AP	SIMULATION: STUDENTS CALCULATE THE LOCATION OF AN EARTHQUAKE
RATS (ECOLOGY SIMULATIONS 2)	CRE CMP	AP,PE,TR	SIMULATION OF EFFECTS OF SANITATION AND FAST OR SLOW POISON ON RAT POPULATION
READ & SOLVE MATH PROBLEMS	ED'L ACTV	AP,PE,TR	TUTORIAL; ANALYZING AND SOLVING MATH WORD PROBLEMS
READABILITY ANALYSIS(SCH UTIL V2)	MECC	AP	ANALYZES A TEXT SELECTION BY ANY OF SIX READABILITY METHODS
READING COMP: WHAT'S DIFFERENT?	PRO DESIGN	AP,AT,PE,TR	COMPREHENSION EXERCISES: SELECT FROM A SERIES THE ITEM WHICH IS DIFFERENT
READING LEVEL	SCH COUR J	AP,PE,TR	UTILITY: ANALYZES TEXT SELECTIONS AND WORD LISTS FOR GRADE LEVEL

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
REDUCE FRACTION	MIC IN ED	PE	USES CHART DIAGRAM TO TEACH REDUCTION OF FRACTIONS
ROBOTWAR	MUSE	AP	INTRODUCES ASSEMBLY LANGUAGE PROGRAMMING AS USER INSTRUCTS DUELING ROBOTS
ROCKY'S BOOTS	TLC	AP	SIX LOGIC GAMES OF INCREASING DIFFICULTY
ROUND (BASIC ARITHMETIC)	MECC	AT	DRILL ON ROUNDING NUMBERS TO THE NEAREST 10, 100 OR 1000
ROUND (ELEMENTARY VOL.1)	MECC	AP	DRILL ON ROUNDING NUMBERS TO THE NEAREST 10, 100 OR 1000
ROUNDING	MIC IN ED	PE	PRACTICE IN ROUNDING NUMBERS TO NEAREST 10'S, 100'S, 1000'S OR 10,000'S
RULER FRACTIONS	MIC IN ED	PE	PRACTICE IN READING THE FRACTIONS OF A RULER
SCRAMBLED LETTERS	ED'L ACTV	AP,AT,PE,TR	TWO STUDENTS COMPETE TO UNSCRAMBLE WORDS; TEACHER MAY ENTER WORDS
SCRIPSIT	RADIO SHAK	TR	WORD PROCESSING: FOR THE BUSINESS EDUCATION DEPARTMENT OR SCHOOL OFFICE
SELL APPLES (ELEMENTARY VOL.3)	MECC	AP	SIMULATION: DECISIONS TO BE MADE TO STAY IN BUSINESS OF SELLING APPLES
SELL BICYCLES (ELEMENTARY VOL.3)	MECC	AP	SIMULATION: STUDENTS COMPETE TO RUN THEIR BUSINESSES MOST SUCCESSFULLY
SELL LEMONADE (ELEMENTARY VOL.3)	MECC	AP	SIMULATION OF DECISIONS TO BE MADE IN RUNNING A LEMONADE STAND
SELL PLANTS (ELEMENTARY VOL.3)	MECC	AP	ADVERTISING IS THE VARIABLE STUDENTS CONTROL IN THIS BUSINESS SIMULATION

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
SHAPES (ELEMENTARY VOL.7)	MECC	AP	PRACTICE IN RECOGNIZING SHAPES & COLORS AND RECALLING THEIR LOCATIONS
SHAPES (PRE-READING)	MECC	AT	PRACTICE IN RECOGNIZING SHAPES & COLORS AND RECALLING THEIR LOCATIONS
SHELL GAMES	APPLE	AP	PROVIDES EMPTY DRILL STRUCTURES INTO WHICH TEACHERS CAN ENTER ACTIVITIES
SIMULATED COMPUTER	EDU-SOFT	AP,AT,TR	TUTORIAL IN OPERATION OF COMPUTER AND IN MACHINE-LANGUAGE PROGRAMMING
SINE & COSINE GRAPHER	MATH SOFT	AP	GRAPHS SINE OR COSINE FUNCTION & VALUES FOR CONSTANTS GRID IN COLOR
SIR WILLIAM WRONG NOTE	MICRO MUS	AP	TRAINS ABILITY TO IDENTIFY WRONG NOTES IN FOUR-VOICE CHORDS
SLOPE (GRAPHING)	MECC	AT	GRAPHS LINEAR EQUATIONS; PROVIDES EXTENSIVE WORKSHEETS
SLOPE (MATH VOL.1)	MECC	AP	GRAPHS LINEAR EQUATIONS; PROVIDES EXTENSIVE WORKSHEETS
SMALLEST UNIT OF MEASURE	SCH COUR J	AP,PE,TR	STUDENTS CHOOSE CORRECT UNIT OF MEASUREMENT OF LENGTH, TIME & VOLUME
SNARK (GRAPHING)	MECC	AT	INTRODUCTION TO COORDINATE GEOMETRY IN GAME FORMAT
SNARK (MATH VOL.1)	MECC	AP	INTRODUCTION TO COORDINATE GEOMETRY IN GAME FORMAT
SNELL (SCIENCE VOL.2)	MECC	AP	SIMULATES THE REFRACTION WHICH OCCURS WHEN LIGHT PASSES BETWEEN TWO MEDIA
SNOOPER TROOPS	SPINNAKER	AP	REASONING, RECORD KEEPING AND RESEARCH ARE THE THREE R'S: USER IS DETECTIVE
SOCCER MATH	COMPUTATNS	AP	IN SOCCER GAME FORMAT STUDENTS ADD, SUBTRACT OR MULTIPLY CORRECTLY TO SCORE

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TITLE	PUBLISHER	COMPUTER	DESCRIPTION
SOLAR DISTANCE (EARTH SCIENCE)	MECC	AT	TUTORIAL: TEACHES NAMES OF PLANETS, THEIR DISTANCE FROM SUN, ETC
SOLAR DISTANCE (ELEMENTARY VOL.4)	MECC	AP	TUTORIAL: TEACHES NAMES OF PLANETS, THEIR DISTANCE FROM SUN, ETC
SOLV'G SIMULTANEOUS LIN SYST	MATH SOFT	AP	DEMONSTRATES SOLUTION FOR LINEAR EQUATIONS WITH TWO UNKNOWNS
SPEED DRILL (BASIC ARITHMETIC)	MECC	AT	DRILL ON THE FOUR MATH OPERATIONS; USER CAN CHOOSE OPERATIONS, DIFFICULTY, ETC
SPEED DRILL (ELEMENTARY VOL.1)	MECC	AP	DRILL ON THE FOUR MATH OPERATIONS; USER CAN CHOOSE OPERATIONS, DIFFICULTY, ETC
SPEED READER	APPLE	AP	WARM-UP, EYE MOVEMENT & COLUMN READING EXERCISES BUILD SPEED & COMPREHENSION
SPELL (ELEMENTARY VOL.2)	MECC	AP	DRILL: WORD IS SHOWN, THEN STUDENT SPELLS IT; ?ACE & WORDS CHOSEN BY TEACHER
SPELL-N-TIME	SCH COUR J	AP,PE,TR	SPEED DRILL ON SPELLING A TEACHER-SELECTED WORD LIST
SPELLING	ED'L ACTV	AP,AT,PE,TR	A PACKAGE MADE UP OF SCRAMBLED LETTERS AND FLASH SPELLING
SPELLING MACHINE	SW ED PSY	AP	SPELLING TUTORIAL WITH BRIEF GAMES AS REWARDS AND CLASS MANAGEMENT SYSTEM
SPELLING PACKAGE	TCH TOOLS	PE	COMPUTER & CASSETTE RECORDER JOIN TO DICTATE & CHECK WORDS TYPED BY STUDENT
SRA CLASSROOM MGMT SYSTEM	SRA	AP,AT	MANAGEMENT SYSTEM IN MATH THAT TEST, PRESCRIBES WORK & RECORDS PROGRESS
SRA DR & INSTR MATHEMATICS B	SRA	AP,AT	THIS PROGRAM DIAGNOSES, PRESCRIBES, PRESENTS CLASS SCORES

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
STATES & CAPITALS	ATARI	AT	STATE OUTLINED ON U.S. MAP MUST BE IDENTIFIED & ITS CAPITAL NAMED BY USER
STATISTICS	EDU-WARE	AP	PERFORMS A VARIETY OF THE MOST FREQUENTLY USED STATISTICAL CALCULATIONS
STEP BY STEP	PRO DESIGN	AP	INTRODUCTION TO THE BASIC PROGRAMMING LANGUAGE IN 10 LESSONS
STERL (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,PE,AP	SIMULATION: PEST CONTROL DECISIONS-BY PESTICIDE OR BY RELEASING STERILE MALES
SUBT CONCEPTS	MIC IN ED	PE	PRACTICE ON THE UNDERSTANDING OF THE SUBTRACTION CONCEPT
SUBT FACTS 0-10 & 0-20	MIC IN ED	PE	TIMED PRACTICE IN SUBTRACTION WITH DIFFERENCES FROM 0-10 & 0-20
SUBTRACTION-ALL LEVELS	TCH TOOLS	PE	SUBTRACTION DRILL ON 12 LEVELS WITH TEACHER CONTROL OF TIME AND NUMBERS OF TRIES
SUPERMAP	APPLE	AP	AT USER'S REQUEST SCREEN DISPLAYS U.S. CITIES, STATES, TERRAIN & OTHER DATA
SUPERTEXT	MUSE	AP	PROFESSIONAL WORD PROCESSING SYSTEM WITH FULL SCREEN EDITOR
SURVIVAL MATH	SUNBURST	AP,AT,TR	A SERIES OF SIMULATIONS WHICH PROVIDE STUDENTS WITH PRACTICE IN CONSUMER MATH
TAG (ECOLOGY SIMULATIONS 1)	CRE CMP	TR,AP,PE	SIMULATED WILDLIFE MANAGEMENT STUDY OF FISH IN A POND
TAXMAN (ELEMENTARY VOL.1)	MECC	AP	TUTORIAL ON PRIME & COMPOSITE NUMBERS AND THE FACTORS OF COMPOSITE NUMBERS
TAXMAN (METRIC & PROBLEM SOLV'G)	MECC	AT	TUTORIAL ON PRIME & COMPOSITE NUMBERS AND AND THE FACTORS OF COMPOSITE NUMBERS

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TITLE	PUBLISHER	COMPUTER	DESCRIPTION
TERRAPIN LOGO	TERRAPIN	AP	ONE OF THE THREE VERSIONS OF THE LOGO PROGRAMMING LANGUAGE FOR THE APPLE
THREE MILE ISLAND	MUSE	AP	SIMULATION: STUDENT CONTROLS OPERATION OF A NUCLEAR POWER PLANT
TI LOGO	TEXAS INST	TI	THE LOGO PROGRAMMING LANGUAGE FOR THE TEXAS INSTRUMENTS COMPUTER
TIC TAC FACTS	MIC IN ED	PE	MATH FACTS REVIEW FOR TWO PLAYERS WITH TIC-TAC-TOE GAME FORMAT
TICTACTOE SPELL	JMH	PE	DRILL ON SPELLING OF 100 COMMONLY MISSPELLED WORDS IN TIC-TAC-TOE FORMAT
TRAIL WEST	MICRO-ED	PE	SIMULATION GAME PITS PIONEER & HIS SUPPLIES AGAINST THE DANGERS OF THE TRAIL
TRAIN (ELEMENTARY VOL.&)	MECC	AP	DRILL ON SEQUENCE OF ALPHABET, SHOWN IN LOWER CASE LETTERS
TYPING	SCH COUR J	AP,AT,PE,TR	PRACTICE IN RAPID LOCATION OF KEY ON THE KEYBOARD, ONE ROW AT A TIME
TYPING TUTOR	MICROSOFT	AP,TR	TUTORIAL ON KEYBOARD & TYPING SKILLS WITH TIMED PRACTICE EXERCISES
URSA (EARTH SCIENCE)	MECC	AT	SIMULATES POSITIONS OF FIVE CONSTELLATIONS NEAR NORTH STAR, ANY DAY OR TIME
URSA (ELEMENTARY VOL.4)	MECC	AP	SIMULATES POSITIONS OF FIVE CONSTELLATIONS NEAR NORTH STAR, ANY DAY OR TIME
VOCABULARY SKILLS: CONTEXT CLUES	MILT BRAD	AP	VOCABULARY DEVELOPMENT USING CONTEXT, CONTRAST & EXAMPLE AS CLUES
VOCABULARY SKILLS: PREFIX/SUFFIX	MILT BRAD	AP	VOCABULARY PRACTICE USING PREFIXES, SUFFIXES AND ROOT WORDS
VOLCANOES	EARTHWARE	AP	SIMULATION GAME OF THE BUSINESS OF PREDICTING VOLCANIC ERUPTION

PREVIEW GUIDE ANNOTATIONS

TITLE	PUBLISHER	COMPUTER	DESCRIPTION
VOWELS	HARTLEY	AP	USING COMPUTER-ACTIVATED RECORDER, DRILLS ON LONG & SHORT VOWELS, ETC
WORD FAMILIES	HARTLEY	AP	STUDENT RECOGNIZES & UNSCRAMBLES HIDDEN WORDS BY LETTER SUBSTITUTION
WORD FIND (ELEMENTARY VOL.2)	MECC	AP	COMPUTER-GENERATED LETTER MATRIX PUZZLE USES TEACHER-SUPPLIED WORD LIST
WORD PRO 4 PLUS	COMMODORE	PE	TOP-OF-THE-LINE WORD PROCESSING PROGRAM WITH MANY FEATURES FOR THE OFFICE
WORDGAME (ELEMENTARY VOL.2)	MECC	AP	GAME: STUDENTS USE CLUES TO FILL IN WORDS; TEACHERS MAY ENTER WORD LIST
WORDS (ELEMENTARY VOL.7)	MECC	AP	GAME: STUDENTS RECALL VISUAL PATTERN & LOCATION OF WORD PAIRS IN PUZZLE
WORDS (PRE-READING)	MECC	AT	GAME: STUDENTS RECALL VISUAL PATTERN & LOCATION OF WORD PAIRS IN PUZZLE
WORDSTAR	MICROPRO	AP (CP/M)	CP/M-BASED OFFICE WORD PROCESSING SYSTEM
WUZZLE (ELEMENTARY VOL.7)	MECC	AP	PRACTICE IN COUNTING OBJECTS IN A GROUP OF MIXED SHAPES
WUZZLE (PRE-READING)	MECC	AT	PRACTICE IN COUNTING OBJECTS IN A GROUP OF MIXED SHAPES
ZAP ADD 2-6 & 5-9	MIC IN ED	PE	ADDITION GAME FOR TWO PLAYERS PROVIDING PRACTICE IN SUMS RANGING 2-6 & 5-9
ZAP MULT 2-6 & 5-9	MIC IN ED	PE	MULTIPLICATION GAME FOR TWO PLAYERS USING NUMBERS 2-6 & 5-9

NOTES:

The following entries have been corrected since the 1983 Preview Guide was published:

ARITHMETIC CLASSROOM: WHOLE NUMBERS (Sterling Swift). This title was deleted since its original inclusion was due to an error in transcription.

DARTS. Publisher change; Creative Computing Software is now being sold by Compuware, and is now so listed.

GEOMETRY AND MEASUREMENT (Cuisenaire). The title is now correctly listed as GEOBOARD GEOMETRY AND MEASUREMENT.

VOCABULARY SKILLS (Milton Bradley). Title addition, now listed as two separate programs- VOCABULARY SKILLS: CONTEXT CLUES and VOCABULARY SKILLS: PREFIXES, SUFFIXES, ROOT WORDS.

WHAT'S DIFFERENT? (Program Design). The correct listing is READING COMPREHENSION: WHAT'S DIFFERENT?

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